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TENTH ANNUAL REPORT  
OF  
THE LOCAL GOVERNMENT BOARD,  
1880-81.

SUPPLEMENT

CONTAINING

REPORT AND PAPERS

SUBMITTED BY THE BOARD'S MEDICAL OFFICER

ON THE

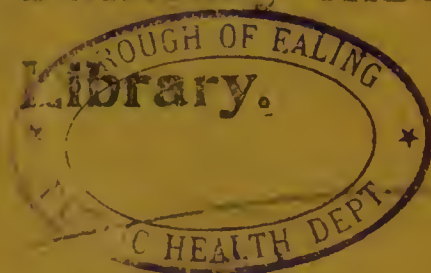
USE AND INFLUENCE

OF

HOSPITALS FOR INFECTIOUS DISEASES.

*Reprinted, with slight Amendments, from the Report presented in  
1882 to both Houses of Parliament by Command of Her  
Majesty. [C.—3290.]*

The Royal Sanitary Institute



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*Presented by*

DR. THOMAS ORR

3rd November

1934



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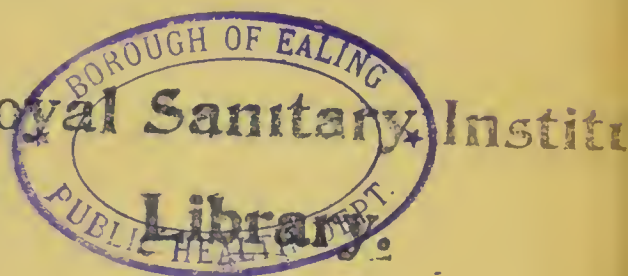
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PUBLIC HEALTH.

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REPORT AND PAPERS

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SUBMITTED BY THE MEDICAL OFFICER

OF THE

LOCAL GOVERNMENT BOARD,

1882.





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## PREFACE TO NEW EDITION.

That another re-issue of the late Sir R. Thorne Thorne's Report on the Use and Influence of Hospitals for Infectious Diseases is called for is in itself evidence of the enduring value of the work. But as twenty years have now elapsed since this Report was written, during which time much experience has been gained of the construction and management of such hospitals, now often called "Isolation Hospitals," it may be well to indicate how far that Report may be taken as a guide at the present day. Briefly it may be said that the general considerations set forth in the General Report in the first part of the Appendix to that volume still hold good, needing very little modification, and comparatively little in the way of addition; but that the Local Hospital Reports in the second part of it, though still of use as a record of experience, are not to be taken as affording models which can with advantage be closely followed at the present day, or as showing the amount and character of the hospital accommodation for infectious diseases possessed at the present time by the districts therein mentioned. Indeed, most of the districts which are referred to in the report as having hospitals of a temporary character, have since replaced them by permanent buildings.

Moreover, since the issue of Sir R. Thorne's Report, the provision of isolation hospitals by local authorities has become much more common. The returns received in answer to a circular letter issued by the Local Government Board in 1879 to all Sanitary Authorities in England and Wales, showed that means of some sort or other for the isolation of infectious cases were possessed by 296 out of a total of 1,593 Sanitary Authorities, viz., by 192 urban, 87 rural, and 17 port authorities. From a Parliamentary Return issued in 1895 it appears that out of 1,653 extra-metropolitan Sanitary Authorities existing in England and Wales at the end of 1892, 631 had at that date provided, alone or jointly with other authorities, some kind of hospital accommodation for infectious diseases. Since 1892 the provision of isolation hospitals has progressed still more rapidly. During the seven years 1893-9, 334 loans for hospital purposes—not all, however, relating to different hospitals—have been sanctioned by the Local Government Board, while many authorities have provided themselves with hospital accommodation without the aid of loans: either by the erection of buildings (often, indeed, of a more or less temporary or makeshift character), out of current revenue, or by entering into agreements for the use of hospitals belonging to other districts. The Isolation Hospitals Act, 1893, has also placed in the hands of County Councils powers, which in some counties have been freely exercised, for the promotion of isolation hospitals.

The chief point in which the conclusions arrived at in Sir R. Thorne's Hospital Report need modification in the light of subsequent experience is with respect to the area to be served by a hospital. From the experience gained during his inquiry Sir R. Thorne formed the opinion that a hospital should, if possible, be within the limits of the district for which it was erected, and that, in order to be reasonably available for its purpose, it should, in the case of a town, be distant not much more than two miles, and in the case of a rural district not more than four or five miles from the populous parts of the district. He did not indeed find that removal for a distance of some five, or even eight or ten miles, in a well constructed ambulance and over ordinarily good roads, had appeared to do harm to patients, provided their removal had been effected at an early stage of the disease; but he did as a matter of fact ascertain that the relatives and friends of the patients assented much more readily to their removal to a hospital within an easy distance than to a more distant one. With increased public appreciation, however, of the advantages of hospital treatment, the objection to removal of patients to a distance from their homes has diminished; and on the other hand, in the case of districts of comparatively small size, combination for the purpose of hospital provision has been found to possess distinct advantages, both as regards economy and efficiency, as compared with the establishment of a separate hospital for each district. Among these advantages may be mentioned the following:—

1. By the establishment of a single hospital in place of two or more hospitals the duplication of various buildings and appliances is avoided; and the cost of fencing and other requisites proportionately to the number of beds is reduced.

2. The classification of patients in relation to the diseases from which they are suffering is facilitated. In a district however small, if provision has to be made for the isolation at one time of two diseases in patients of both sexes, there must be two pairs of wards, each pair having no enclosed aerial communication with the other pair. But the same number of wards may serve for a considerably larger population, and even if the size of the wards may have to be increased, this can be effected by adding to their length, which is a less costly matter than erecting a new block.

3. Combination enables a more efficient staff to be maintained. A hospital serving a small district may be empty for prolonged periods, but this is less likely to happen with a hospital serving a larger area; hence for the latter it will be worth while to retain permanently a competent staff, which may be impracticable for a small hospital, which is often empty.

For reasons like these it is commonly advantageous, where local circumstances permit, for the smaller districts to combine for the provision of isolation hospitals, since by so doing they can obtain better accommodation than they could provide out of their own resources.



The number of Joint Hospital Boards, which was 32 in 1892, has increased to 51 at the end of 1900. A number of Joint Hospital Committees have also been formed by orders of County Councils under the Isolation Hospitals Act, 1893, and other districts have combined in a less formal manner, or have entered into agreements for the use of the hospitals belonging to neighbouring districts.

Since the date of Sir R. Thorne's Report there have been very few instances in which an isolation hospital for the use of the inhabitants of the district in general has been established and maintained otherwise than by a sanitary authority or combination of authorities; though there have been some cases in which an isolation hospital has been erected by a private benefactor, or as a memorial, and afterwards handed over to the sanitary authority to be maintained by them. Moreover, the hospitals at Bradford, Dover, and Leeds, and the Monsall Hospital at Manchester, which at the time of the Report were not in the hands of the respective Corporations, have since been transferred to them.

The practice of receiving infectious cases at general hospitals has also declined in recent decades; though enteric fever is still frequently treated in general hospitals, and diphtheria occasionally, especially cases requiring operation; but few, if any, general hospitals now receive cases of scarlet fever, and none receive small-pox patients.

The danger of the spread of small-pox in the neighbourhood of hospitals in which patients suffering from that disease are aggregated, which Sir R. Thorne had in two instances found reason to suspect, and which was fully illustrated by the report in the same volume "On the Influence of the Fulham Small-pox Hospital on the neighbourhood surrounding it," has since been exemplified by the further observations on the influence of the Fulham Hospital published in the Annual Report of the Medical Officer of the Local Government Board for 1884, and by experience during epidemics of small-pox at Sheffield, Bradford, Warrington, Leicester, Gloucester, and elsewhere. On the other hand in London the removal of small-pox cases to hospitals at a distance, instead of treating them in hospitals within the metropolitan limits, has been followed by a remarkable diminution in the prevalence of the disease. In the years following the great epidemic of 1871 until 1885 minor epidemics recurred in London about every four years; but since 1886, the year in which the treatment of small-pox in hospitals within the limits of the Metropolis was discontinued, the London death-rate from that disease (including the deaths from small-pox of Londoners in the hospitals outside the Metropolis) has declined almost to a vanishing point.

The following are some points of detail on which a few remarks are requisite in order to bring the information given in Sir R. Thorne's Report up to the present date:—

Page 4.—*Transfer of Workhouse Hospitals to Sanitary Authority.*—Section 14 of the Poor Law Act, 1879, under which a hospital for the reception of persons suffering from any dangerous infectious disorder vested in the Guardians of any Union for poor law purposes might be transferred to them in their capacity as rural sanitary authority, has been rendered inoperative owing to the alterations in the constitution of local authorities effected by the Local Government Act, 1894. There are, however, other modes in which the transfer may, with the Board's consent, be carried out.

Page 9.—*Administrative block.*—A point in which many of the earlier hospitals, such as were described in Sir R. Thorne's Report, have been found to be deficient is the inadequacy of the accommodation for the housing of the staff necessary for the efficient working of the hospital. A similar defect is often met with in hospitals of a temporary or extemporised character. This deficiency has sometimes led to complaints, not always without foundation, of the management of the hospital; to injury to the health of the nurses who have been compelled to spend their time both by day and night in the infected air of the ward-blocks; and to difficulty in procuring extra nurses on an emergency. It must be remembered that each ward-block, if occupied by patients who are seriously ill, will require the services of at least one day nurse and one night nurse, and that the nurse who is on duty at night must have some place where she can sleep undisturbed in the day; also that all persons who are employed about the hospital, such as laundry women, should reside on the premises.

It may also be remarked that the laundry accommodation provided in the earlier hospitals has also often been found to be insufficient. At all but the smallest hospitals it is desirable that the laundry block should comprise a wash-house, a drying closet, and an ironing room, so arranged that the clean clothes shall not come into contact with the soiled articles.

Page 10.—*Wooden and iron buildings.*—In addition to the objections to buildings of this class which are mentioned in Sir R. Thorne's Report, their liability to destruction by fire and storm must be borne in mind. On several occasions hospitals of a temporary character have been overturned by a gale, or rapidly destroyed by fire, in some instances with loss of life.

Page 13.—*Projecting surfaces to be avoided.*—In recent hospitals it has been the general practice to round off the angles of the wards, both vertical and horizontal, with a view to avoiding spaces which may tend to harbour infective dust or dirt.

Page 17.—*Separation wards.*—Further experience has emphasized the need here pointed out by Sir R. Thorne



for the provision in connection with an isolation hospital of a block containing small wards separately entered from the open air. Such wards are useful under a variety of circumstances, and must be regarded as an essential part of a properly equipped isolation hospital. Thus at every isolation hospital a certain number of cases must be expected to be received of which the nature is not at the time of reception free from doubt, or which eventually prove to be of a different disease to that from which they were supposed to be suffering. These cases may have occurred under circumstances in which to leave the patient at his residence until the diagnosis was perfectly clear would involve grave danger of infection to other persons, *e.g.*, when a suspected case of infectious disease occurs in a boarding-school, an hotel or lodging house, or a place of retail business. On the other hand, if there be doubt whether the patient really has the suspected disease, it is not fair to him to place him in a ward among persons suffering from that disease. Hence the need for small wards not in enclosed aerial communication with any other ward, in which such a patient can be kept under observation until the nature of his disease is clear without either endangering others or being endangered himself. Again, such wards are of advantage for cases where a second disease may supervene upon the first, as diphtheria or measles on scarlet fever, and they may serve, as mentioned in the Report, for the treatment of a case of an additional disease at the time when the other ward-blocks are occupied, for the segregation of a delirious or offensive case, or as private wards for persons willing to pay for such accommodation. Some of these purposes may be served by single bed wards attached to the main pavilions, but it would not be safe to treat in such wards cases which were, or might prove to be, of a different nature to those in the main wards with which they were connected; and to meet the need for accommodation suitable for the isolation of such cases the form of ward-block shown in the plan B attached to the appended Memorandum has been devised.

Page 28.—*Compulsory removal to hospital.*—In the case of *Warwick v. Graham* (80, L.T. 773) it was held by the Queen's Bench Division of the High Court that the words "without proper lodging and accommodation" in section 124 of the Public Health Act, 1875, refer to the protection of other persons from infection, and not merely to the welfare of the patient himself.

Page 36.—*Disinfecting apparatus.*—Investigations made since the date of the Report have shown that as a disinfecting agent steam under pressure or in the current form is far superior to hot air or dry heat, both in its power of destroying contagia, and in its power of penetrating badly conducting materials, as well as in its uniformity of action and ease of control (see Report on "Disinfection by Heat," by Dr. Parsons, in the Annual Report of the Medical Officer of the Local Government Board for 1884). Several efficient forms of steam disinfecting apparatus are now to be had at a comparatively moderate cost.

Page 40. *Distance of hospitals from boundary.*—Further experience has shown no reason for suspecting that the infection of diseases other than small-pox may be conveyed through the air for a distance so great as 40 feet, so as to be a danger to persons outside the hospital.

As regards the influence of isolation hospitals over the prevalence of infectious disease it is still too soon to form a conclusion. It is to be remembered that it was only in 1889 that local authorities obtained power to require the notification of such disease without a local Act of Parliament, and it was only in 1899 that notification became compulsory throughout the kingdom. In order to ascertain the effect of any measure in reducing the prevalence of a disease such as scarlet fever, which tends to recur in epidemic form at tolerably regular intervals of a few years, it is necessary that the observations in a given locality should be sufficiently prolonged to cover several epidemic and intervening periods. In the case of diphtheria, a disease of which the duration in a given locality both of an epidemic and of the quiescent period is longer and more irregular than in the case of scarlet fever, the difficulty of judging of the influence of any measure over the prevalence of the disease is still greater. If, instead of comparing period with period in the same locality, we seek to institute comparison between the prevalence of a given disease during the same period in different localities differing in the extent to which hospital isolation is practised, we have to take account of differences in other circumstances which may affect the prevalence of such disease, especially the age constitution of the population, and must also bear in mind that an epidemic period in one locality may not coincide with an epidemic period in the other locality.

The usefulness of isolation hospitals in arresting an outbreak of infectious disease at an early stage is clearer than their usefulness in extinguishing a developed epidemic or in reducing the prevalence of a disease endemically present in a community. If the first case of an infectious disease in a district, a locality, or a household be promptly recognised and removed to hospital, the further spread of the disease may often be prevented. Occasionally a second case may have been contracted before the first case can be removed, but where failure occurs in cutting short the outbreak by the removal of the first case, it is usually due to the nature of the disease not having been promptly recognised, or to the friends of the patient not being willing at first for him to be removed.

W. H. POWER.

August, 1901.

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# REPORT.

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TO THE RIGHT HONOURABLE JOHN GEORGE  
DODSON, M.P., PRESIDENT OF THE LOCAL  
GOVERNMENT BOARD.

SIR,

I HAVE the honour to lay before you, in the following pages, reports on the use and influence of hospitals for infectious diseases. They represent the outcome of prolonged and careful inquiries by Dr. Thorne and Mr. Power into the conditions of the greatest usefulness of hospitals, regarded as places for the treatment of the infected sick and as institutions for the protection of communities against the spread of infection, and they have taken account of any drawbacks to the usefulness of hospitals that might be met with in practice.

MEDICAL  
OFFICER'S  
REPORT.

Hospitals for infectious diseases in England date from a century ago, when they began to supersede the old parish "pest-house" which had, up to that time, formed the only special provision for the treatment of the infectious sick. The original design of these hospitals was to promote the recovery of the individual poor patient for whom other accommodation was wanting; indeed, the name "house of recovery" was a frequent synonym for infectious-disease hospital at the period when such an institution was first seen to be necessary. But it was inevitable that the advantages to be obtained by the district possessing a hospital should soon force themselves on the attention of the observer, and from a very early period of their history infectious-disease hospitals have been advocated on the ground of their protecting the household against the spread of infection.

Earlier  
experiences.

The benefits of these hospitals were not, however, obtained without a good deal of misfortune within the walls of the institutions themselves. In the small-pox hospital, indeed, this was not so apparent. Small-pox had from the beginning been regarded as requiring a special building to itself: it had a "specific" contagion, which could not safely be treated under the same roof with the "general" contagion of fever. So, in the hospital where no disease but small-pox was received, patients had no opportunity of contracting other diseases: the nurses, in early times selected from among those who had passed through an attack of small-pox, and in later times having their vaccination specially cared for, took nothing from their patients. But in the "fever hospital" the case was different. Doctors and nurses caught fever—in some years more than in others: while convalescent

patients had what appeared to be repetitions of "fever" attacks. So serious indeed did these misadventures become that forty years ago it had come to be spoken of as doubtful whether fever cases, if they were to be treated in hospitals at all, had not better be distributed through the wards of general hospitals. The experiment was tried, but with far greater disaster to the patients and attendants of the general hospital.

It was at this time that the medical profession was learning from bedside observation that under the name of "fever" or "continued fever" or "typhus fever," at least three different diseases had been confounded; the distinction brought with it clearer views than had before been obtainable respecting the causation of the several diseases, and most important differences were discovered in the conditions of their spread from person to person. The hopes of early sanitary reformers, that all fevers might be banished if only good drainage and pure water could be secured, had to be limited to the case of that form of fever which was distinguished as "typhoid" or "enteric." The fever for which the name "typhus" was now reserved, and the fever which had come to be known as "relapsing," were found to have their analogy with small-pox, with measles, with scarlatina, with the fevers that had been distinguished as "specific." It was soon learnt that this typhus fever and relapsing fever were not to be got rid of by improvements in drainage and water; and no preventive or palliative of the nature of vaccination existed in their case. In large towns, under conditions of crowding and filth and want, these diseases would from time to time become epidemic in the houses of the poor. And now, in the interests of the community, the need for making infectious-hospital provision became freshly apparent. Removal to hospital of typhus or relapsing fever was seen to be the only available means for preventing the extension of the disease through the house and about the town. The same fact, too, had by this time come to be apprehended concerning other infectious diseases that had before been thought of as almost necessary incidents of existence, but which were found, now that statistics of death causes were to be had, to be among the most formidable contributors to the registers of mortality; and this not only in the crowded house or in the poor quarters of a town, but almost equally so in the well-to-do family and in the country district. Especially was this the case with scarlet fever. In respect of this disease the advantage of separation of the sick from the healthy had indeed been recognised in the family, but had been but little thought about in the larger community. Not for it were the earlier "houses of recovery" devised. But as the power of hospitals to limit the spread of other infections came to be more fully seen, so with scarlet fever there appeared ground for hoping that a stop might be put to its progress in a district that made adequate provision of hospitals.

Thus the part to be played by the infectious-disease hospital in the protection of the community from disease was seen to



be most important; and under existing circumstances of life, especially among the poor, there was no other means of gaining this protection. Even in the case of small-pox there remained much need for the removal of infected people to hospital.

It was not, however, till further progress had been made towards an understanding of the conditions for the greatest usefulness of an infectious-disease hospital that any extensive provision of such institutions was made. Even general hospitals were not without drawbacks to their usefulness. "If the crowding of healthy men has its dangers," says Dr. Parkes, "the bringing together within a confined area many sick persons is far more perilous." Contamination of air, impregnation of the building by morbid substances, were conditions of danger to inmates. But in the infectious-hospital there were more serious risks even than these. Not only attendants on the sick, but the sick themselves were liable to contract dangerous infectious disease. These risks had to be reduced to their minimum before the full benefit of the isolation-hospital to the community could be conferred.

An important step in this direction was made in 1862 at the London Fever Hospital, and the credit of it belongs to its then physician, the late Dr. Murchison. As it had been the practice since the establishment of all infectious hospitals to treat small-pox in a separate building, and as it had become the practice to separate scarlet fever from other fevers in the wards of a fever hospital, so now a still more detailed classification was found to be needed. Typhus fever was now for the first time rigorously kept apart from other forms of continued fever; with the result that one patient only contracted typhus in the hospital for every 346 patients admitted with typhus; whereas before the separation was insisted on, persons admitted for other complaints were attacked by typhus in the proportion of one to every 40 cases of typhus admitted.

Classification  
within  
hospital.

Even with fair separation between the several infections there remained a risk, which, if small, was still appreciable, that patients in these hospitals might contract fresh disease in them, while for nurses and medical attendants there was much more serious risk. It varied, indeed, according to the sort and quantity of disease received into the hospitals; but the sort of disease to be admitted could not be determined by regulation, and the quantity of it was continually increasing as the advantages possessed by the hospital over the home were being increasingly recognised. But, what was more, instances were not wanting to show that the risk to patients and attendants varied according to the goodness or badness of the arrangements of construction and administration.

With the object of learning about the conditions for perfection in hospitals generally, a comprehensive inquiry was made for the Privy Council, twenty years ago, under the direction of their Medical Officer, by Dr. Bristowe and Mr. Holmes. The inquiry was a fertile one, and the Report of 1863 still forms the best body of information respecting hospitals in

Inquiry of 1863.

England. Among other subjects discussed in it, the best kind of provision for the hospital treatment of infectious disease was considered. The reporters, while not contending that the requirements of communities could be met by any hospital provision short of special institutions, took occasion to investigate the conditions under which it was permissible to receive particular infectious diseases into wards devoted to non-infectious disease. Studying the circumstances of cleanliness, of ventilation, of ward administration under which infected patients might be thus received, with a minimum of risk to other sick in the wards, they brought back many a lesson that could be applied in promoting the recovery of patients, in preserving them against dangers incidental to the hospital, and in reducing the very special dangers necessarily incurred by those in attendance upon the sick in infectious hospitals.

Legislation.

At this time, when it had come to be certain that isolation hospitals were an essential part of the defences of a district against disease, and when the conditions for their usefulness had been to a considerable extent defined, the Sanitary Act of 1866 conferred upon local authorities the power of erecting and maintaining such hospitals. This power was given afresh to urban and to rural sanitary authorities alike by the Public Health Act of 1875.

Your Board, acting on the advice of its medical department, has lost no opportunity of pressing on local sanitary authorities the importance of making use of these powers. In 1871 a memorandum on hospital accommodation was prepared for the assistance of those who had occasion to make provision for the isolation in hospital of infected persons who could not be retained in their own homes without danger to others, and this memorandum has since been in constant use. In view of the experiences gathered by medical inspectors of the disaster, resulting in the absence of public provision for the isolation of infectious disease, to district after district into which fever, small-pox, or scarlatina had chanced to be introduced, the Board has urged upon local authorities the necessity of having some isolation accommodation ready at all times in anticipation of the first appearance of infectious disease, and has endeavoured to show the means by which this could best be provided for the large and the small community respectively. Sanction to the borrowing of money for the erection of isolation hospitals has been freely given, and the services of the architectural and medical departments have ever been placed at the disposal of authorities desirous of carrying out this important branch of their sanitary duties.

Local  
experiences.

The efforts of your Board with this object have been fairly successful. From a return made to the Board in 1879 of sanitary districts that had provided themselves with means of isolation for infectious disease, it appeared that 296 authorities had arrangements of one sort or another, in hospitals of their own or by an understanding with their neighbours, for the reception of infected persons who could not be treated at their own homes with safety to other people. The arrangements were indeed often of a



rudimentary and insufficient character; but some authorities had liberally and wisely used their powers, and had provided excellent fever and small-pox hospitals.

MEDICAL  
OFFICER'S  
REPORT.

In view of this return and from other considerations that forced themselves on the observation of the Board, it became evident that authorities who might be wishful to provide hospitals were frequently finding themselves hindered by lack of experience, by apprehension of difficulty, and by the real difficulty arising from the objection of landowners to sell land for the purposes of an infectious-hospital, and from the objection of householders to have an infectious-hospital for their neighbour. It was presently seen that the Board could usefully collate for the assistance of such sanitary authorities the experiences of other authorities who had, under comparable circumstances, provided their districts with hospitals. Moreover, it had become essential to learn whether or not there was ground for the fears of landowners and neighbours, and what were the conditions for removing or reducing any real danger that might be found to exist. This knowledge was wanted indeed for the Board's own purposes, since it had become the Board's custom, before acceding to proposals of local sanitary authorities to borrow money for hospital construction, to satisfy itself that the proposals were such as to afford the greatest attainable advantage to the locality.

To an inquiry with the objects here indicated Dr. Thorne Thorne has devoted many months of the years 1880-81; and his report occupied the greater part of the present volume. He has inspected about 70 hospitals in use by urban, by rural, and by port sanitary authorities: of every variety of locality, size, and construction; some thoughtfully devised on a scale adapted to the needs of their districts, and reckoned by those who had provided them as among the most valuable sanitary defences of those districts; others ill-placed, or on an altogether insufficient scale or badly planned, doing duty in default of better, though of flimsy material and hurried construction. And in administration the hospitals have varied from such as were freely opened to all who would in the interests of the community and themselves put the hospitals to their designed use, and such as were provided with arrangements, accommodations and appliances fitting them for that use, to others that made the payment of large sums the condition of admission to them and others that were wanting in one or many of the commonest essentials of hospital efficiency.

Dr. Thorne's  
inquiry.

As respects the advantages which Dr. Thorne has been able to demonstrate as accruing to a district from the provision of an infectious-disease hospital in it, it is found that, with few exceptions, the hospitals have been used for the isolation of infected people who, in the absence of the hospital, could not have been isolated at all, but must have spread disease to their neighbours. And their use has not been by any means restricted to persons so lodged that their removal to hospital might be effected by compulsion. There are districts where the well-to-do artisan

and shopkeeper, and people of ranks of life esteemed even higher than these, have been glad to profit by the advantages of the hospital, and have had their confidence justified by their own more assured recovery as well as by the satisfaction of having secured their housemates from disease and death.

Growing use  
made of  
hospital.

And the further gratifying fact appears from Dr. Thorne's report that where any reasonable accommodation has been provided there has been an increasing disposition on the part of the neighbouring population to make use of it, and even to allow their little ones to be put under the care of strangers in the hospital. Young children of ten years and under have ranged in various towns between 33 and 81 per cent. of the whole number received. The proportion of adults in the hospital was, as might be supposed, larger when small-pox or "fever" has been the prevailing disease; the proportion of young children larger when the hospital was chiefly used for scarlatina. Now-a-days, in the case of scarlatina, it would seem that the percentage contributed in some districts by children out of the total admissions is very closely the same as the percentage borne by children out of the total attacks of scarlatina in England. This fact alone may be taken as sufficient evidence of growing public confidence in these hospitals regarded as places for the recovery of the sick.

The report draws a strong distinction between the utility of hospitals that had been deliberately prepared and kept in readiness against the time when infectious disease might appear in the district, and of those others that had been provided when an epidemic prevalence of disease was seen to be commencing. In the case of the former, the isolation of the sick person effected by the hospital had repeatedly appeared to mean the prevention of an epidemic in the locality. "I could occupy you for hours," says Dr. Thorne, of the evidence he has collected, "in telling you "instances in which epidemics have evidently been prevented by "the isolation of first cases of infectious disease." But of the hospital hastily run up when small-pox or fever is making head in the district, the report has little good to say. "It is often not "ready for occupation," he writes, "until the immediate cause of "its erection has passed by; it provides accommodation of a very "indifferent sort: it fails, almost without exception, to meet the "permanent requirements of the district, even when in amount "it turns out to be more than the district needs; and thus the "object of the hospital, as a part of the sanitary defences of the "district, is often attained in a very imperfect manner and at a "needlessly large cost." Dr. Thorne's observations in this particular strengthen the grounds of the advice which the Board ever gives to local authorities, that it is a condition of the highest degree of importance for the usefulness of these institutions that their accommodation shall be ready beforehand.

The general belief of districts where isolation hospitals have been erected that epidemics have repeatedly been prevented by



their means, and the multiplied instances of danger proved to have been averted from the units of the community—of disease prevented in the household, in the school, and in the factory—must be taken for the present in the absence of adequate statistical evidence as proving the total advantage of the hospitals to the entire community. Dr. Thorne does indeed adduce certain statistics that have been presented to him as evidence of the efficacy of hospitals, where extensively used, to diminish the prevalence and mortality of infectious disease in one and another district. But longer experience than any now available is wanted before the value of the hospital to the community can be proved by statistics.

Whether or not any injurious effect upon the health of a population could be traced to the presence of a hospital in its midst was the further problem which Dr. Thorne's inquiry was directed to solve, and his results are chiefly negative. He has in several cases found infection communicated through some fault of administration, fault of a sort that should not have existed at a hospital, but which would have been simply inevitable if the sick had been under private management. Further, he has in the case of small-pox recorded two instances where infection had appeared to spread from a hospital in a row of houses to other houses, in a way that suggested conveyance of the infective matter through the atmosphere rather than by means of persons or things. In many other instances the same disease, small-pox, being in question, Dr. Thorne heard of no extension of infection to neighbouring streets and houses, in spite of the best inquiries that he and officers of health before him could make. This is all: for the rest, Dr. Thorne having to tell many a story of hospitals in which the circumstances of site, of construction, and of management might have been better than they were, has nothing to record of fevers, scarlet, typhus, enteric, or other infectious diseases spread from the hospital, as such, to its neighbourhood.

What extension of disease from hospital.

The very experience that has led to the present practices of disease-classification within fever hospitals, and that has required small-pox to be treated in distinct buildings, is consistent with an *à priori* expectation that on careful inquiry it might be possible to discover round ill-placed hospitals instances of the spread of disease, especially of small-pox: for it could not be affirmed that on passing the doors or windows of the hospital the air-borne material of infection became inert. At a former time, indeed, it was thought that the infection must needs be destroyed by dilution; but with better knowledge of the pathology of infection and with recognition of the material of infection in its near relations with particulate matter, this expectation had to be modified. It came to be seen that dispersion of infection was not necessarily synonymous with destruction of it, and with the new knowledge it was felt that fresh assurances respecting its destruction would have to be gained. Wherefore it is assuredly satisfactory to note how few instances of an infection seeming to have been conveyed

through the air were discoverable in Dr. Thorne's prolonged inquiry.

It is not necessary for me to refer at length to the lesson taught by Dr. Thorne's experiences of disease occasionally distributed from hospitals that are carelessly administered. Occurrences such as these ought not to be witnessed in hospital practice. They are the accidents, I repeat, inevitable in the infected home of the patient, but for the avoidance of which the hospital is directly intended. But the reported occurrences give occasion to insisting that hospitals for infectious disease should, without exception, be under direction of a skilled sanitary officer, who should be responsible for care in every sanitary detail, and whose duty it should be to inform himself not only of the wholesomeness of the hospital, but of the health of its neighbourhood, to investigate the facts as to any apparent spread of disease from the hospital and the means by which any actual spread may have taken place. Without such an officer apprehensions to the discredit of the hospital will be sure to arise, and importance will infallibly attach to the most frivolous equally with the most real of them.

Dr. Thorne has prefaced his report upon the hospitals of particular districts by a comprehensive report on the various subjects requiring attention in the provision of infectious hospitals generally; on questions of site and construction, of cost, of warming and ventilation, of classification and administration. He distinguishes between efficient and inefficient hospitals, and considers the reasons of success or failure in the attainment of results. He gives experience about drainage and water supply; about ambulances, disinfecting chambers, and mortuaries. In his account of particular institutions, he has inserted a number of useful plans and drawings. The whole forms a mass of instructive matter for the assistance of sanitary authorities and their advisers, and it will facilitate, I trust, their operations for securing for their districts the very great advantage of public means of isolation.

Special London  
experiences.

When Dr. Thorne's inquiry was planned, it was not intended that it should extend to the metropolis; and in the end, beyond a little contribution from the experience of the London Fever Hospital, his report has dealt with the provinces only. This limitation was made partly for the reason that the circumstances of London were expected to be so intricate that the influence of hospitals on the population would be specially difficult to recognise, partly for the reason that the principal infectious-disease hospitals of London are poor law institutions, and in respect of their sanitary matters the Board is habitually advised by Dr. Bridges. But at the end of 1880, when Dr. Thorne's inquiry was in an advanced state, representations were received by the Board that cases of small-pox were occurring in an exceptional fashion round certain of the Metropolitan Asylums Board hospitals; and it was felt that Dr. Thorne's experiences on this subject derived from hospitals in the provinces ought not without further inquiry to be accepted as re-



presenting the whole truth for hospitals in London. Accordingly Mr. Power was associated with Dr. Thorne for the particular purpose of examining the facts for the neighbourhood of Fulham Hospital, and his report on the subject forms the second of the two papers comprised in the present volume. The investigation proved to be complex and lengthy. Its method was indicated, shortly after the inquiry began, by a sudden outburst of small-pox that occurred in January 1881, which gave Mr. Power the opportunity of studying with very notable exactness and at the earliest possible moment all the circumstances of one of those local epidemics which had been supposed to be connected with the proximity of hospitals. The outburst affected the parishes of Chelsea, Fulham, and Kensington, near the junction of which the small-pox hospital is situated. These parishes had before been practically free from small-pox, but in the course of a fortnight 56 houses in them became invaded by the disease, and some curious further limitations both in place and time became apparent. Mr. Power soon found that he was probably dealing with some altogether exceptional factor of small-pox; for a special area having the hospital for its centre suffered to a notable degree in excess of neighbouring parts, and in point of time the outburst had coincided with importation of small-pox into the hospital from distant parts of London. From the facts of this particular outburst Mr. Power passed on to consider the evidence to be derived from hospital records during former years, and he found repeated resemblances between the phenomena of the 1881 epidemic and the distribution of small-pox around the hospital in each of the epidemic periods during which the hospital had been in use. In the end he announces the following unexpected but most instructive results of this inquiry concerning Fulham Hospital:—

There has been in each epidemic period an excessive incidence of small-pox on houses in the neighbourhood of the hospital as compared with more distant houses in Chelsea, Fulham and Kensington.

Conclusions  
from Fulham  
inquiry.

The percentage of houses invaded in the neighbourhood of the hospital has become gradually smaller as the distance of the houses from the hospital has increased. This gradation has been very exact and very constant.

Houses upon the chief lines of human intercourse with the hospital have not suffered more than houses lying in other directions from the hospital.

In point of time, there has been a very marked relation between the varying use of the hospital and the manifestations of excessive small-pox in the neighbourhood. This relation has not shown itself while the use of the hospital has been for convalescents only.

The appearance of excessive small-pox in houses around the hospital has never been delayed until the hospital has become full or nearly full. It has been always most remark-

able at the time when admissions to the hospital were beginning to increase rapidly.\*

On comparison of different epidemics, an almost constant ratio is observed between the amount of the hospital operations and the degree of excess of small-pox on the neighbourhood.

Going on to investigate the means by which this repeatedly observed extension of small-pox from the hospital to its neighbourhood could have occurred, Mr. Power inquired with great minuteness into the arrangements and doings of the hospital, into the management of wards, laundries, and other departments; into affairs of visiting and ambulances; and in regard of the particular events of January 1881, he would almost seem to have made every person attached to the hospital account for his or her doings during every hour that those doings could have been of importance. But all his inquiries failed to yield any adequate explanation, either of the habitual peculiarity of small-pox incidence about the hospital, or of the special occurrences by which he was confronted at the commencement of his own inspection. He was at last forced to the conclusion that—

The machinery of the hospital administration, with inclusion of defects in that machinery, does not account for the peculiarity of small-pox incidence within the three parishes of Chelsea, Fulham, and Kensington since the establishment of the hospital.

There must have been some condition or conditions operating to produce the observed distribution of small-pox around the hospital that have pertained to the hospital as such, and that have been in excess of the conditions for small-pox extension as usually recognised.†

Mr. Power's report concludes with consideration of the various atmospheric conditions of the time when infection must, whatever its source, have been conveyed to the houses around the hospital, and he records certain very marked peculiarities of that period. His observations on this subject are independent of his conclusions as to the facts of disease extension previously obtained, but they afford most suggestive matter for the study of those who

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\* It is an interesting circumstance to which Mr. Power directs attention, that in the succeeding months of active operations, though the use of the hospital may have gone on increasing, the excess of small-pox upon the neighbourhood has habitually become less marked.

† On these conclusions Mr. Power notes :—"To these propositions it should be seen to be a corollary; that every detail in the machinery of the hospital that is within the province of hospital administration becomes of more importance to the protection of the neighbourhood than ever before. The apprehension that, outside of conditions over which man has [direct] control, there may exist other conditions conducing to the spread of small-pox from a hospital to its neighbourhood should be a reason for increased and not for diminished watchfulness in the management of the hospital, in order that such other conditions may be deprived, as far as human foresight can deprive them, of the opportunity of exerting their influence."



may hereafter have to deal with similar appearances of disease-distribution from hospitals.

Looking to the great and prolonged care and thought that Mr. Power has given to his inspection and to the appearances of uniform law in the results which he reluctantly announces, I have no choice but to accept the above conclusions, and to believe that the Fulham Hospital, with all its advantages of site and construction and with the many excellences of its administration, has by dissemination of small-pox material through the atmosphere, given rise to an exceptional prevalence of small-pox in its neighbourhood.

Upon the report it must be observed:—*first*, that the disease with which the inquiry has been concerned was small-pox; the disease, namely, that has long been known to have an exceptional ability to spread, and which is shown in Dr. Thorne's report to have spread occasionally from provincial hospitals in a way that other infections have not spread; but against which we possess, in vaccination, another kind of protective influence beyond that which we have in the case of scarlet fever or typhus:—*secondly*, it is to be distinctly noted that the report relates to Fulham Hospital *only*, and it is possible that the circumstances of that hospital are in some way exceptional, and that its experiences cannot be taken as true for other small-pox hospitals in London; it is to be remembered, however, that there have been allegations against other London small-pox hospitals; that Hampstead, Homerton, Deptford, have all come under suspicion; and inquiry has been made for the Board, though not by the Medical Department, respecting the district around Homerton:—*thirdly*, and as regards the total influence of small-pox hospitals on the London community, it has now come to be of great interest to examine the comparative incidence of small-pox; in London by the side of the provinces, of late years in comparison with former years; for exceptional mortality of London during recent years, and any unusual feature in the behaviour of small-pox will deserve to be considered from the view point of the Fulham experience.

On the presentation of Mr. Power's Report, it was seen to be of great importance that his facts and inferences should without loss of time be subjected to special skilled examination. And your Board felt it to be of even greater immediate importance to examine the consequences, upon existing small-pox hospital practice in the metropolis, resulting from such of Mr. Power's conclusions as might be found justified. These functions are being undertaken by a Commission recently appointed by Her Majesty to inquire into the whole subject of hospital accommodation for fever and small-pox cases in the metropolis. I have already given to the Commission such information as was in my own possession respecting the last of the above three points; and I am awaiting their report with the utmost interest, for though its more direct concern will not be for my own department, I am

Appointment  
of Royal  
Commission.

expecting to learn from it many lessons respecting the conditions under which infectious-disease hospitals generally can be used with the greatest advantage to the districts providing them, and with the smallest amount of risk to their immediate neighbours.

I have the honour to be,

Sir,

Your obedient servant,

GEORGE BUCHANAN.

February 1882.

[Since the issue, in the autumn of 1882, of the Report of the Royal Commission on Small-pox and Fever Hospitals, further investigation has been made by the Medical Department, from time to time, as to the influence exercised in London by Small-pox Hospitals on the neighbourhoods surrounding them. An account of these investigations will be found in the Reports of the Medical Officer for the years 1884, 1885, and 1886. *Re-issue of 1893.*]

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APPENDIX.

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## No. 1.

### On the USE and INFLUENCE of HOSPITALS for INFECTIOUS DISEASES, by DR. THORNE THORNE.

APP. NO. 1.

On the Use  
and Influence  
of Hospitals  
for Infectious  
Diseases, by  
Dr. Thorne.

#### I.—GENERAL REPORT.

I HAVE the honour to report that, in accordance with the Board's instructions, I have made inquiry into certain points relating to the use and influence of Hospitals for Infectious Diseases.

During the course of the inquiry I have visited a large number of sanitary districts in England and Wales. In each locality I have sought information as to the nature and extent of the advantages that the different sorts of isolation-provision have afforded to the communities for whose benefit they have been established; I have, as far as possible, made myself acquainted with the several circumstances affecting the use of the hospitals; and I have endeavoured to learn both what has been the extent of influence for good, and also whether there has been any, and if so what, influence for evil, as regards the neighbourhoods surrounding such hospitals, as the result of their use for the isolation of cases of infectious diseases.

Until 1866 the legal enactments in force offered no such facilities to sanitary authorities or other public bodies as were calculated to lead to any general provision by them of hospitals for infectious diseases, and, apart from the few remaining parish "pest-houses," which were apparently provided by the parishioners independently of any legal enactment, those institutions which I have found to have been established before that date were all erected by private effort.

Statutory  
enactments  
relating to  
infectious  
hospitals.

Under an "Act for the prevention as far as possible of the disease called Cholera or Spasmodic or Indian Cholera in England (1832)," 2nd William IV. ch. 10., an Act which in the first instance only continued in force until the end of the next ensuing session of Parliament, but which was later on continued in operation for a further period under 3rd & 4th William IV. ch. 75., it was enacted that the Privy Council might under any order or orders make rules "for the prevention as far as may be possible" of cholera, and "for the relief of any persons suffering under or likely to be affected" by that disease. So also, under an Act passed in 1846 "for the more speedy removal of certain nuisances, and to enable the Privy Council to make regulations for the prevention of contagious and epidemic diseases until the 31st day of August 1847, and to the end of the next session of Parliament," 9th & 10th Victoria, ch. 96., it was enacted under section 5 that the Privy Council might under an order or orders make such rules and regulations "as to them may appear expedient for the prevention as far as may be possible of any such contagious or epidemic disease, or for the relief of any person suffering under, or likely to be affected by, any such disease." No hospital appears, however, to have been established under either of these Acts; indeed I have been unable to ascertain that any orders were ever issued under them.

Under the tenth section of the Nuisances Removal and Diseases Prevention Act, 1848, the General Board of Health were empowered to issue such directions and regulations as they might "think fit for the prevention, as far as possible, or mitigation of . . . epidemic, endemic, or contagious disorders," and to provide, amongst other things, "for the dispensing of medicines, and for affording to persons afflicted by, or

Nuisances  
Removal and  
Diseases Pre-  
vention Act,  
1848.



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Diseases Pre-  
vention Act,  
1855.

“ threatened with, such epidemic, endemic, or contagious diseases, such  
“ medical aid as may be required.” I am not, however, aware that any  
means of isolation were provided under this statute. Certainly none so  
provided has been met with.

Under the fifth section of the Diseases Prevention Act, 1855, it is  
enacted that “ whenever any part of England appears to be threatened,  
“ or is affected by any formidable epidemic, endemic, or contagious  
“ disease,” the Lords of Her Majesty’s Council may by Order or Orders  
direct that the provisions contained in that Act “ for the prevention of  
“ diseases be put in force in England or in such parts thereof as in  
“ such Order or Orders respectively may be expressed.” And under  
the sixth section of the same Act, the General Board of Health was  
authorised, “ after the issuing of any such Order as aforesaid, and whilst  
“ the same continues in force ” to “ issue directions and regulations ”  
amongst other things for “ guarding against the spread of disease and  
“ affording to persons afflicted by or threatened with such epidemic,  
“ endemic, or contagious diseases, such medical aid and such accommo-  
“ dation as may be required.” So also under an Act of 2nd August  
1858, 20th and 21st Victoria, ch. 38, the powers relating to the pro-  
tection of public health heretofore vested in the General Board of  
Health became vested in the Privy Council. And further, in “ An Act  
“ to amend the Acts for the removal of nuisances and the prevention of  
“ diseases,” 6th August 1860, there are certain provisions determining  
what shall be the local authority for executing the Diseases Prevention  
Act. On the 14th July 1866, and following on the appearance of  
epidemic cholera in London, an Order in Council was issued directing  
that the provisions contained in the Diseases Prevention Act, 1855,  
should be put in force “ within the whole and every part of England.”  
On the 20th and 21st of the same month two orders were issued, one to  
the extra-metropolitan, and the other to the metropolitan authorities,  
these orders embodying the directions and regulations to be in force.  
Under these it was provided that where the Medical Officer of Health  
or the “ medical adviser ” recommends, the board or vestry shall, with  
as much despatch as practicable, provide fit and proper accommodation  
for the reception of such patients as have no home or cannot be properly  
treated at home and may with advantage to themselves be removed. .  
“ . . . ” And it was further provided that “ if cholera or choleraic  
“ diarrhoea exist in any dwelling whereof the medical practitioner  
“ reports that the sick and healthy cannot therein be properly separated,”  
the board or vestry “ shall forthwith cause adequate accommodation to  
“ be procured for the reception of the healthy. . . . ” Under these  
orders several “ cholera hospitals ” were established both in the  
metropolis and in the provinces, and some, such as that met with in the  
Tynemouth urban district, have since then been maintained by the local  
sanitary authorities as hospitals for the reception of the several infectious  
fevers.

Sanitary Act,  
1866.

Under section 37 of the Sanitary Act, 1866, power was given to  
the Sewer Authority, or in the metropolis the Nuisance Authority, to  
provide for the use of the inhabitants within its district hospitals or  
temporary places for the reception of the sick. These authorities could  
either themselves build such hospitals, or make contracts for the use of  
any existing hospital or part of a hospital, or for the temporary use of  
any place for the reception of the sick, or they could enter into any  
agreement with any person or body of persons having the management  
of any hospital, for the reception of the sick inhabitants of its district, on  
payment by the authority of such annual or other sum as might be  
agreed upon. And with a view of giving effect to these provisions, the



carrying into effect of this section was deemed to be one of the purposes of the Sewage Utilization Act, 1865, under which Sewer Authorities both acquired the rights possessed by Local Boards of Health, under the Local Government Act, 1858, and certain Acts amending that Act, of borrowing money on the security of the rate, and they also obtained the necessary powers for taking lands. Under the same section it was enacted that two or more authorities might combine in providing a common hospital. And, under section 26 of the same Act, power was given to any justice, by order on a certificate signed by a legally qualified medical practitioner, to direct the removal to a hospital within the district of a Nuisance Authority, and at the cost of that authority, of any person suffering from any dangerous, contagious, or infectious disorder, being without proper lodging and accommodation, or lodged in a room occupied by more than one family, or being on board any ship or vessel.

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This provision was enlarged by section 51 of the Sanitary Laws Amendment Act, 1874, which enacted that every such hospital which should be declared by an order of the Local Government Board to be situated within a convenient distance of the district of any authority, should be deemed to be within the district of such authority. And with a view of affording further facilities for giving effect to it, the same section provided that every person wilfully disobeying the order of a justice, or obstructing the execution of the same, should be guilty of an offence punishable on summary conviction before two justices, and be liable to a penalty not exceeding ten pounds.

Sanitary Laws  
Amendment  
Act, 1874.

Under the provisions of the Public Health Act, 1875, the various powers relating to hospitals for infectious diseases referred to, were re-enacted with certain modifications; and certain additional powers bearing upon the prevention of the spread of infection by isolation and otherwise were provided. Section 131 embodies the various powers of a local authority to provide hospitals. Power of removal to any such hospital under an order of a justice, very similar to that given under section 26 of the Sanitary Act of 1866, is contained in section 124. The limit as to the locality of the hospital, is, however, for this purpose modified, and it is only necessary that the hospitals shall be provided either "within the district of a local authority" or within a convenient distance of such district, and those who are subject to such compulsory removal are described as "any person who is suffering from any dangerous infectious disorder, and is without proper lodging and accommodation, or lodged in a room occupied by more than one family, or is on board any ship or vessel." It is further enacted that "any person so suffering, who is lodged in any common lodging-house, may . . . be so removed by order of the local authority." And further, any person who wilfully disobeys or obstructs the execution of such order shall be liable to a penalty not exceeding 10*l*. Section 125 provides for the removal by any local authority to any hospital to which such authority are entitled to remove patients and for keeping in such hospital as long as may be necessary any persons brought within their district by any ship or boat who are infected with a dangerous infectious disorder. It is also provided under section 132 that any expenses incurred by a local authority in maintaining in a hospital a patient who is not a pauper shall be deemed to be a debt due from such patient to the local authority, and may be recovered from him at any time within six months after his discharge from such hospital, or from his estate in the event of his dying in such hospital.

Public Health  
Act, 1875.

A local authority is further empowered, amongst other things, 1<sup>o</sup>, under section 123 to provide and maintain a carriage or carriages for



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the conveyance of infected persons; 2°, under section 122 to provide a proper place, with all necessary apparatus and attendance, for the disinfection of bedding, clothing, or other articles, free of charge; 3°, under section 121 to direct the destruction of any bedding, clothing, or other articles which may have been exposed to infection from any dangerous infectious disorder, and to give compensation for the same; and, 4°, under section 141, to provide and fit up a mortuary, to which, under section 142, the body of anyone who has died of any infectious disease may under certain specified conditions be removed under an order of a justice.

Under section 134 the Local Government Board may make, alter, and revoke regulations, amongst other things, for the "provision of medical aid and accommodation" and may declare all or any of the regulations so made to be in force within the whole or any part or parts of the district of any local authority; and under section 139 the Board may by order authorise or require any two or more local authorities to act together for the purposes of the Act relating to the prevention of epidemic diseases, and they may prescribe the mode of such joint action and of defraying the costs thereof.

Poor Law Act,  
1879.

And lastly, under section 14 of the Poor Law Act, 1879, provision is made for the transfer to the guardians of any union, in their capacity as a rural sanitary authority, of any hospital or building for the reception of persons suffering from any dangerous infectious disorder, which has hitherto been vested in them for poor law purposes, such transfer to be confirmed by an order of the Local Government Board, who may determine either the contribution towards the maintenance of the building which shall be made by an urban authority in the union using it, or failing such use of it by any urban authority, the value of the interest of that urban part of the union in the building, and the manner in which such value is to be paid.

Hospital  
Memorandum.

With a view of assisting sanitary authorities in providing the isolation that is needed for cases of dangerous infectious disease, a Memorandum relating to that subject was in 1871 issued from the Medical Department of the Privy Council Office. It had reference mainly to the principles which should be held in view in the provision of temporary means of isolation, but it at the same time indicated some of the more important principles on which permanent hospitals should be built. In 1876 the same Memorandum, with certain additions, was re-issued by the authority of the Local Government Board, and since that date it has from time to time been modified, in the light of more recently acquired experience. A copy of the latest issue of this Memorandum is appended at page 359.

Board's  
circular letter.

The first step which was taken with a view of ascertaining both the amount and the character of any hospital provision for infectious diseases which had been made by sanitary authorities under the several legislative enactments referred to, was the issue by the Board in 1879 of a circular letter to all sanitary authorities in England and Wales, requesting them to supply information: 1°, as to the nature of any such accommodation (other than in connexion with the workhouse) available in each sanitary district; 2°, as to the method by which it had been provided; 3°, as to the date since which it had been available; 4°, as to whether the accommodation was of a permanent or a temporary character; 5°, as to the number of beds available, and as to the possibility of separating the sexes; 6°, as to the separate isolation of two or more different infectious diseases; 7°, as to the number of patients, suffering from several specified infectious fevers, who had been



treated in the hospital during the three years 1876-78; 8°, as to the charge, if any, made for admission, &c., and the amount repaid by patients; 9°, as to the original cost of the hospital; 10°, as to the cost of maintaining the hospital. This information was also to be supplemented by a short report by the Medical Officer of Health on the working of the arrangements for the isolation of patients and upon the influence which, in his opinion, it had exercised upon the spread of infectious disease. (A copy of this letter is appended at page 43.)

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During the course of the year the answers to this letter were received, and it was then ascertained that means for the isolation of infectious diseases, of some sort or another, was possessed by 296 out of a total of 1,593 Sanitary Authorities in England and Wales. Of this number 185 urban, 85 rural, and 16 port authorities were in England; whereas in Wales there were 7 urban and 2 rural authorities, beside 1 port authority. These answers are at times referred to in the body of this Report as the Hospital Returns.

It was, however, evident from a mere perusal of the returns that in many instances the hospital provision reported was only such in name. In some districts also the accommodation referred to was only available for one or more of the infectious fevers to the exclusion of the remainder, and in many the means of isolation, though professedly in readiness, has never been used at all. By means of this return, however, much information was gained which was highly useful for the purposes of my inquiry, and in arriving at a conclusion as to the districts which it would be desirable to visit, it was specially helpful.

Districts were specially selected for inspection as representing the following classes: 1°, those where there had been evident failure, as well as those where success had been experienced in securing isolation; 2°, those where hospitals had been provided by the Sanitary Authorities themselves, as also those where arrangements had been made for the reception of patients into infirmaries and other institutions belonging to private bodies; 3°, those where the existing hospital was used solely for the purpose of a single sanitary district, as also those where several Sanitary Authorities combined either in maintaining or in using one hospital jointly for the purposes of their several districts; and 4°, those where permanent, as well as those where temporary accommodation had been made, or was still in use.

Sanitary dis-  
tricts visited.

In all 67 hospitals were visited; 65 urban, 13 rural, and 4 port sanitary authorities being concerned in their provision. The inquiry concerning them involved investigation as to the use, or professed use of them, by as many as 150 sanitary authorities in all. A list of all the districts belonging to these authorities will be found in the form of an Index at page 299.

The hospitals visited included every description of building which has hitherto been used for the reception of the sick; they varied very much in their method of construction and in their fitness for the purposes to which they were put; and the degree of success which had resulted from their provision differed very widely. But in nearly every district something was learnt which bore directly or indirectly upon the use and influence of hospitals for infectious diseases, the information procured in many of them being of great value.

The principal objects of this Report are: 1°, to bring together the details of the actual experience which has been gained in a large number of districts having various requirements as regards the isolation of the several infectious fevers; experience bearing alike on locality, construction, cost, and methods of administration; and 2°, to summarise in a compendious form the lessons which have been learnt during the



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course of a lengthened inquiry which has had for its object to acquire all such information as was available on the subject of the use and influence of hospitals for infectious diseases.

The former object has, I trust, been to a great extent gained by the separate reports which I have drawn up as regards the several localities visited, and which are appended. The latter object I propose in the main to carry out by a general reference to the several points concerning which I have reason to believe useful information has been acquired, this information being grouped, for the purposes of reference, into subdivisions corresponding fairly with the headings under which the detailed matter alluded to in each separate report has been collected.

Origin of the  
several hospi-  
tals visited.

The origin of the several hospitals visited has been very varied. In some instances, as for example at Cheltenham and at Bradford, a munificent donation or bequest, supplemented by private subscriptions, has, within a recent date, led to the erection of hospitals well adapted to the purposes they are intended to serve. Some of the older and more imperfect hospitals, such as those in Newcastle-upon-Tyne and Carlisle, were originally erected and maintained by public subscriptions, but they have since then been taken over by the sanitary authorities. At Dover and at Ashford the hospitals were each originally built and managed by a medical practitioner who felt the necessity for such an institution, and saw no chance of the needed provision being made in any other way. But by far the larger proportion of the hospitals which I have visited were the outcome of panic resulting from either the actual prevalence of some epidemic or the anticipated invasion of some infectious disease. Thus, for example, in the Tynemouth and the Whitehaven urban districts the expected invasion of cholera led to the provision now existing, and in the Amersham rural district an epidemic of typhus was the cause of the erection of a hospital. But in point of number, small-pox far outweighs all other infectious diseases in having secured some sort of hospital provision. In the urban districts of Birkdale, Birmingham, Broadstairs, Cleator Moor, Derby, Egremont, Huddersfield, Margate, Newark, Norwich, Nottingham, Oldham, Pemberton, Penrith, Ramsgate, Salford, Scarborough, Southend, Southport, Sunderland, Tonbridge, Walsall, Warwick, Wigan, Wolverhampton, and Workington, and in the rural districts of Alcester, the Isle of Thanet, Penrith, Warwick, and Whitehaven, I found that the fear of the immediate spread of small-pox had led to the provision of the hospital accommodation. Few of these hasty small-pox hospitals have a satisfactory after-history. Some of them have never received a single patient of any kind; others have been found, upon their first use, so unsuited for their purpose that it has not been thought worth while to keep them in common repair. A third set having been used for small-pox, would be available, it was expected, for the isolation of cases of scarlatina; but it was found that people did not dread scarlatina enough, to let their relatives and children be taken away to a tarred shed of repulsive aspect such as had sufficed for the district hospital when small-pox was in question. Some few, however, having in a noteworthy degree served the immediate object for which they were built, have also since then had a marked influence in staying the spread of other infectious fevers by means of the isolation they afford. Those in the Alcester rural and to a less degree in the Sunderland urban district may be referred to as among the exceptions. Some, however, such as those for the Isle of Thanet combined district, those at Oldham and at Southport which were more leisurely erected but which were not completed until after the cessation of the epidemics leading to their construction, were so built as to be much better adapted to the purposes of a hospital for

Cholera and  
typhus leading  
to hospital  
provision.

Small-pox  
leading to  
hospital pro-  
vision.



the reception of the several infectious fevers, and they have since their completion afforded proof of the good results following upon early isolation.

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Scarlet fever rarely a cause of hospital provision.

Scarlet fever has only rarely been an immediate cause of hospital provision, and this, notwithstanding the fact that the mortality it occasions is so greatly in excess of that resulting from small-pox.\* At Leicester, however, its prevalence was one of the grounds which led the Sanitary Authority to erect a hospital, and at Grantham a tent hospital encampment was built to stay the spread of that disease.

Erection of hospitals during non-epidemic periods.

Some hospitals of a temporary character having more or less served the immediate purpose of staying an epidemic have been abandoned or so altered that permanent structures have replaced them, and these may fairly be considered in connexion with those which sanitary authorities have erected when no epidemic was prevalent, but solely with a view of being prepared to isolate such first cases of infectious diseases as might arise in or be imported into their districts.

The hospitals at Huddersfield and Salford are instances of permanent provisions for isolation, mainly or partly completed after the cessation of a small-pox epidemic; the hospitals at Lewes and at Tonbridge are instances of buildings constructed after the disuse of temporary hospitals which had respectively served to isolate enteric fever and small-pox cases; whereas in the Bradford, Cheltenham, Darlington, Folkestone, Middlesbrough, Sheffield, Solihull, and Warrington urban districts, and in the Berkhamstead rural and the Weymouth port districts, hospitals may be seen which have been provided during non-epidemic periods, and when time could be given to the consideration of the various details as to site and construction so necessary to the complete success of a hospital for infectious diseases.

These latter hospitals afford a striking contrast to those which were erected in a hurried manner, and the descriptions given both as to their construction and the purposes they have served will, in almost every instance, amply suffice to show that the suitability of the hospital buildings in various parts of the country is to a very large extent dependent upon the circumstances under which they have been erected. If a hospital is hurriedly built under the influence of panic, it is often not ready for occupation until the immediate cause of its erection has passed by; it provides accommodation of a very indifferent sort; it fails, almost without exception, to meet the permanent requirements of the district even when in amount it turns out to be more than the district needs; and thus the object of the hospital as a part of the sanitary defences of the district is often attained in a very imperfect manner and at a needlessly large cost. Salford may be referred to as a conspicuous illustration of this latter point. On the other hand, the hospitals which have been erected during non-epidemic periods with a view of preventing epidemics by having in actual readiness means for the isolation of first cases of infectious disease, afford as a rule excellent examples of the kind of isolation-provision which all sanitary authorities should possess, and this Report will give plentiful examples of their success in their intended object.

Immediate and permanent usefulness of hospital impaired by hurried erection.

Success dependent on having hospital provision in actual readiness.

Passing on to record the experiences gathered during my inquiry as to the conditions for usefulness of an isolation-hospital, I would first make a few observations on the situation of such hospitals.

Site and soil.

The difficulties which attach to the acquirement of a site for a hospital for infectious diseases have often been found to be so great

\* The total deaths in England and Wales during the ten years 1870-79 were:—1°, from small-pox, 57,433; and, 2°, from scarlet fever, 173,724.



that sanitary authorities have frequently to be content with one which is not so good as they would desire. Regard should, however, be had to several important points.

There are found to be strong reasons why the site should be easily accessible to the population for whose benefit the building is provided, such accessibility having reference both to distance and to facility of approach. It is not that removal for a distance of some 5, and even, in isolated instances, 8 and 10 miles in a well-constructed ambulance and over ordinary good roads, has appeared to do harm to the particular patient, provided the removal has been effected at an early stage of disease. By far the greatest difficulty in the matter of distance has been found, as a rule, to lie with the relatives and friends of the patients, who assent much more readily to removal to hospital if it be within such distance as to enable them without much trouble and without material interference with their business and other vocations, to make frequent inquiry as to the patient's welfare. In rural districts the question of distance is usually less thought of than in urban districts, especially when the hospital to which removal is effected is in or near some centre to which the population often travel in connexion with their daily or occasional pursuits. The question of removal from one district to another has evidently in some cases an important bearing upon the position of a hospital, for patients who willingly consent to removal for a distance of several miles within a district that they are familiar with as their own, often exhibit the strongest reluctance to removal for a shorter distance from a rural into an urban district, and even more from one urban district into another. Thus, the almost complete failure which has attended the arrangements made by sanitary authorities in the neighbourhood of Bradford, Leeds, Manchester, and Middlesbrough to use the infectious hospitals in those towns for the purposes of the districts surrounding those boroughs must to some extent be attributed to this feeling.

In so far as the experience acquired during the course of my inquiry suffices for the formation of an opinion on this point, I would in very general terms say that a hospital should if possible be within the limits of the sanitary district for the purposes of which it is erected, and that under any circumstances it should, to be reasonably available for its purposes, in the case of a town not be much more than 2 miles, and in the case of a rural district not more than 4 or 5 miles from the more populous portions of the districts concerned.

Experience, however, such as was gained at Todmorden, shows that even when a hospital is situated within but a mile of a town, as the crow flies, but can only be reached by medical practitioners as the result of a circuitous and somewhat difficult journey, the building, though urgently needed for the purposes of isolation, may entirely fail to effect its intended purpose.

I have been led to regard a moderately elevated site on a gentle slope and on a dry soil where the free circulation of air about the hospital buildings was not interfered with, and where an abundant and wholesome water-supply together with reasonable facilities for drainage were available, as having distinct advantages over sites differently circumstanced.

It is also become increasingly apparent as the inquiry progressed that in determining the size of a site special regard should be had to 1<sup>o</sup>, the reasonable seclusion of the hospital buildings; 2<sup>o</sup>, the provision of ample space both as regards the buildings and the number of patients to be received into them; and 3<sup>o</sup>, the need for future permanent extension of the hospital buildings, in case of an increase in the population,



or of the erection of temporary means of isolation in the event of any epidemic prevalence which may result from inability or failure to isolate first cases of disease.

Where the shape of a site and the necessary conditions attending the arrangement of the buildings have permitted of choice, it has under most circumstances been found desirable that the opposite side windows of the war-pavilions should as nearly as possible respectively face somewhat to the south of east and to the north of west, and that any departure from this rule should be in the direction of a south-easterly and north-westerly aspect, rather than in that of a south-westerly and north-easterly. By this means both of the side walls of the hospital wards are in turn brought under the influence of the sun's rays, a large amount of daylight is secured, the spaces between any two or more parallel pavilions become well warmed and lighted, and at the same time direct exposure to the e st wind is avoided.

The necessity of having every site so effectually enclosed as to prevent any communication between persons in the hospital and those outside is obvious, and a spread of infection to the outside public was in several instances ascertained to have been due to the imperfect manner in which this had been carried out. As a rule a substantial wall or close fence at least 6 ft. 6 in. high is found necessary for this purpose.

The more efficient hospitals for infectious diseases, which have been provided by sanitary authorities in order to meet the wants of their districts, have under ordinary circumstances consisted of: 1<sup>o</sup>, an administrative block; 2<sup>o</sup>, at least four wards, in two separate pairs, and in which patients of both sexes, suffering from two different infectious fevers, can be simultaneously treated; and 3<sup>o</sup>, certain outbuildings, such as wash-house, mortuary, &c. These buildings have been either permanent or temporary. As regards permanent buildings attention to the following points has been found necessary.

The Administrative Block is nearly always so constructed that the offices and apartments it contains are in excess of the requirements of the permanent ward buildings, and are hence adapted, without having recourse to further erections, to the wants of such permanent or temporary extensions as may at any future date become necessary. Having regard to economy of space, it has as a rule consisted of more than one story; and in its general construction the rules and regulations governing the erection of good modern dwelling-houses have been observed. The accommodation it affords must necessarily vary very much according to circumstances, but as a rule it has been found to contain adequate accommodation for a caretaker and his wife, or for a matron when a porter or other male servant is maintained on the premises; a kitchen, together with scullery, larder, pantry, &c., so fitted as to serve the requirements of all the hospital inmates; sleeping accommodation for nurses and staff, that for nurses being, in most cases, on an upper floor, where those who are at work at night may rest by day without being disturbed; a medical officer's room and dispensary; bath-room and closets for the staff, &c. In larger hospitals it is also found necessary to make provision for the accommodation of a resident medical officer, and to provide a mess-room for the nurses and staff. The administrative block is always either completely detached from the ward-buildings or it communicates with them by means of a passage, either in part or in whole open at the sides, so that a cross current of air may pass between the respective buildings. It is also, as a rule, so placed with regard to the entrance to the hospital premises, that visitors or other persons can enter it without passing the buildings containing the wards.

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Ward build-  
ings.

Iron buildings.

The ward buildings which have been met with in so-called permanent hospitals have been constructed either of brick, stone, or concrete, alone or in combination, or of corrugated iron, or again of wood. By far the majority have consisted of brick, with stone or glazed coloured brick ornamentation; some, as at Bradford, are throughout of stone, lined with brickwork; and in one instance, namely, in the Weymouth port district, very excellent results have followed the use of concrete. Corrugated iron is not in frequent use; it has generally been resorted to when an effort has been made to cope with a threatened or an existing epidemic; the buildings have been hurriedly erected and the result has not been satisfactory. Even when the iron has throughout been lined with match-boarding, it has often been found impossible to keep the wards sufficiently warm in winter, or sufficiently cool in summer, and it has in some instances been deemed risky to use them at all during the colder season of the year. One of the better examples of iron buildings which were met with is that at Southport, but there was no available information as to the temperature at which its wards could be maintained in winter.

Wooden  
buildings.

Of the wooden ones much the same may, as a rule, be said. Nearly all have been erected under the influence of panic, and hence they have generally been very imperfect in point of construction. But even where the walls, as also the wooden or tiled roofs, have been well lined with match-boarding, a space of some 5 or 6 inches, either filled in with sawdust or not, thus intervening between the outer and inner layer, it has during the winters of 1879-80 and 1880-81 been, as a rule, found impossible at all times to maintain within them a sufficiently equable or sufficiently warm temperature, even when the fire-places were good as regards both construction and position, and when the window surface and the means of ventilation into the outer air have been by no means excessive.

Difficulty in  
maintaining  
equable  
temperature  
in them.

At Nottingham where the two layers of wood forming the walls are 6 inches apart, the interspace being filled in with sawdust, it was on one occasion found impossible, even when large fires were maintained night and day, to raise the temperature near some of the beds beyond 32° Fahr.; in the Alcester rural district, where there is a very similar building, the temperature was found in the winter of 1880-81, and under the same conditions, to fall to 38° Fahr.; in several such hospitals I heard of water freezing near the beds of patients; some are designedly not used in winter weather; and in one instance one of the more substantially constructed wooden buildings was closed during a recent winter because it was believed that the death of two patients had been brought about by the low temperature which it had been found impossible to obviate. In some of the more solid wooden constructions, as at Birmingham and Oldham, so low a temperature has evidently been avoided, but in neither of these districts was I able to procure thermometric observations as to ward temperature. Having reference, however, to the experience which has been acquired, I cannot but conclude that, as regards permanent hospitals in this climate, wooden and iron buildings as ordinarily constructed are not, as a rule, well adapted to the purposes of wards. That they can be constructed so as to ensure a reasonable and a fairly equable ward temperature, I do not doubt, but when so constructed, their original cost would probably not fall short of, if it did not indeed exceed, that incurred in the erection of ordinary brick buildings; they would be less durable than these, and the cost of maintaining them in a proper state of repair is undoubtedly greater than that needed for the maintenance of the more substantial structures.



Having regard to the desirability of securing surfaces which are easily kept free from dirt and infection, and which dry rapidly after being cleansed, it has appeared to me that wooden-lined wards are not adapted to the varying needs of a permanent building, especially in cases where the several sets of wards cannot always be reserved for the same diseases. On the other hand, no information has been forthcoming during the course of my inquiry tending to show that wards composed of the more permanent materials, but which are well-constructed, well-ventilated, and well-administered, became in process of time less fitted for the reception of the sick than they were when first erected.

By far the majority of hospitals visited had all their ward accommodation on the ground floor, an arrangement clearly the most convenient for administrative purposes and also possessing other advantages. Where, however, a site was necessarily limited there was an advantage in the hospital buildings being of two stories and having a belt of unoccupied land around them, in place of being of one story only and covering the site up to, or nearly up to, the limit of the ground. The former plan allowed of something in the shape of airing grounds being provided, besides favouring such reasonable distance between the hospital and neighbouring roads and houses, as is desirable for the purpose of giving confidence to the public and of reducing any real risk there may be from the proximity to hospital. Where these conditions have been complied with and where the wards on both floors, as also the buildings generally, were well-ventilated and well-administered, I was not able to learn of any experience tending to show that such an arrangement had in any way acted prejudicially.

Instances were, however, met with which tended to show that in the interests of the patients themselves, and this even where a site was properly chosen, any such overcrowding of buildings, or of patients, on site, as could either hinder, or interfere with the purity of, the air entering the ward windows, should be carefully avoided. Especially did it appear necessary so to arrange the buildings as to prevent the possibility of dead-house, laundry, kitchen, and neighbouring ward emanations, from interfering with the purity of the air surrounding the patients. So also disregard of the chance of offending or injuring neighbouring dwellings by reason of the proximity of the hospital buildings to them, was found in some cases to have led to much inconvenience and to subsequent expense.

Amongst the hospitals visited and where these several necessary conditions have been fulfilled, I would name those in the Bradford, Cheltenham, Tonbridge, and Warrington urban districts, in the Berkhamstead and Solihull rural districts, and that belonging to the Weymouth port authority. In none of these instances does the number of patients per acre exceed 20. As typical of the reverse conditions the wooden pavilions at Birmingham which are deemed to suffice for the purposes of some 70 patients per acre, and the three-storied buildings at Salford where some 65 patients per acre are accommodated, may be specially noted.

In all efficient hospitals which have, within a recent date, been provided for the isolation and treatment of cases of different infectious fevers the buildings are so constructed that patients suffering from each separate disease may be in a separate building, having no enclosed means of communication with any other hospital building. This result is, as a rule, obtained by the construction of pavilions, standing at a proper distance from each other and from the administrative building. In the case of a one-storied building each pavilion contains as a rule two wards, one at either end, for each sex, the wards being separated in the centre by an entrance lobby and certain administrative

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apartments. In the case of a two-storied building the pavilion has a male ward on the ground floor, and a female ward upstairs, each floor having a separate lobby and administrative rooms. Examples of both these arrangements may be seen in the plans accompanying this Report.

In the arrangement of the buildings it has been found that the distance between the several pavilions, and between them and the administrative block, should, if possible, be equal to one and a half times their height when the buildings are of equal height, and, if otherwise, at least equal to the full height of the higher of the two adjacent buildings; also that the means of communication between them should be limited to a roofed passage, either entirely open at the sides or having permanent openings facing each other in the opposite side walls, or again to a roofed passage fitted with a central partition and being completely open on both sides of the partition, the persons using the passage walking on the lee side of the partition. Examples of the former arrangement are described in connexion with many hospitals referred to in this Report; the latter arrangement is described in connexion with the Bradford Fever Hospital, where an exposed site rendered sufficient opposite side openings in the passage inexpedient.

In the case of a small-pox pavilion, it has appeared to me that the separation between it and the other hospital buildings should, if possible, be even more complete, and where such an arrangement can be carried out, that the administrative apartments it contains should be such as to reduce communication with the administrative block to a minimum. Especially should there be in connexion with the pavilion separate sleeping accommodation for nurses. In some districts, as at Folkestone, the small-pox hospital is an entirely separate institution, situated at a distance from the hospital for the other infectious fevers. In several hospitals visited small-pox is not admitted.

With reference to the construction of the pavilions, regard has, in all good hospitals, been had to the conditions deemed necessary in the construction of a good dwelling-house. The foundations have been laid in a soil free from animal or vegetable matter; the whole ground surface of the site has been underdrained when necessary, and in some of the better examples of hospital buildings, it has been covered with a layer of cement concrete, or asphalte, or it has been otherwise prepared so as to exclude both dampness and also emanations from the soil which might subsequently become contaminated, as by accidental leakage from a drain. The walls have consisted of good bricks, of hard stone, or of a combination of the two, or of some similar material such as concrete; they have been provided with an efficient damp-course; and with a view to the maintenance of an equable ward-temperature, it has been found necessary that they should be at least 14 inches in thickness. It has also been found necessary to provide windows in each of the opposite side walls. The roof, whether of slate or tiles, has been in great part or entirely ceiled within. Where, as in Sheffield, flat roofs have been made, they can conveniently be constructed of concrete, asphalte, or other similar material.

The floors, provided beneath with means of ventilation into the outer air, have in all cases consisted of wood, and when this has been both well-seasoned and so laid as to prevent the occurrence of spaces between the planks, the result has been fully satisfactory. Where such inter-spaces have taken place they should at once be filled in with wood or some other suitable material. The internal surface of the walls are best made of glazed bricks, or of cement, so that they can be at regular and frequent intervals washed or otherwise cleansed. The glazed-brick walls, as in the Delancey Hospital, Cheltenham, are attractive

Arrangement  
of small-pox  
pavilion.

Construction  
of ward-  
pavilions.

Floors.

Walls.



and admit of easy cleansing; and Parian cement when put on, as at Weymouth, so as to present a hard, impervious, porcelain-like surface, is well adapted to the purposes of hospital wards. Ordinary brick or cement walls which are periodically lime washed and then covered with a slightly toned wash, are also neat and cleanly.

Architraves and cornices or other projections in connexion with the walls have often, as at Weymouth, very properly been avoided, for they all tend more or less to harbour dust containing infective matter. For a similar reason flat ceilings are found preferable to any pitched roofs which need to be supported by projecting beams or rods.

The windows should be made for the purposes of ventilation as well as of admitting light, a point that has been overlooked in some of the more modern buildings where I found that only small portions of the several windows were made to open. Having these objects in view, I am of opinion that a double-hung sliding sash window is the one which is best adapted to the purposes of a hospital ward. These sashes are often surmounted by a third and smaller hinged-sash, fitted with side flaps, so that the air entering from without shall be directed towards the ceiling. The lower frame of each sash-window may also, as in the Berkhamstead rural and the Weymouth port hospitals, be with advantage made with a deep bottom rail so that the sash may be opened to allow of the entrance, in an upward direction, of air between the meeting rails, whilst the window remains closed above and below. With a view of securing a cheerful appearance, the bottom of the windows should not be more than about 3 feet above the floor level, and to ensure adequate movement of air in the upper parts of the ward, it has been found necessary that the top should not be less than some 6 inches, at the most from the ceiling or the wall-plate, as the case may be. The best arrangement of windows is found to be that which provides for one between every two adjacent beds, and one near the angle of the ward beyond each end bed. Movement of air, and such ample light as tends to secure cleanliness, is thus insured in those parts of the wards standing most in need of such requirements.

The amount of window surface which it is desirable to ensure for a ward is a subject which has received some attention. Having regard to cheerfulness, to adequate means of lighting and ventilation, as also to the maintenance of an equable and sufficient ward temperature, it has appeared to me that in a well-constructed and efficiently warmed building the amount of window surface to cubic space should not vary much beyond the limits of 1 square foot to from 60 to 80 cubic feet; a proportion of about 1 square foot to every 70 cubic feet being, as a rule, the most advantageous. The experience obtained in the Children's Hospital at Pendlebury in this connexion (see page 182) deserves special consideration, for, due regard being had to ventilation, the failure to maintain the ward air equably warm, and at the same time sweet, was to a great extent due to the excessive window surface, which there amounts to 1 square foot for every 35 cubic feet.

Windows in the opposite side walls, whilst affording the principal means of ward-ventilation, and constituting indeed the only effectual means by which thoroughly and in a short time, to change the entire ward air, as, for example, when all the windows are opened on the occasion of cleaning out the wards, do not however suffice for this purpose. The space between the floor and the bottom of the patient's beds is found always to require independent ventilation, as by openings into the outer air situated just above the floor level, and each capable of being closed by means of a small sliding door, on one or other side of the ward, according as the weather may temporarily necessitate. Similar

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Projecting  
surfaces to be  
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Window  
construction.

Relation of  
window  
surface to  
cubic capacity  
of wards.

Additional  
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## Warming.

openings near the ceiling level are also, as a rule, provided. "Tobin" tubes have occasionally been usefully resorted to. One or more vertical enclosed shafts passing from the ceiling through the roof are also, as a rule, requisite to carry off such air as is either too hot or no longer pure. But it must be regarded as certain that the provision of even excessive facilities for the escape of impure air, as by roof shafts, should in no case be allowed to interfere with the provision of ample means for admitting fresh air into the wards, at a lower level.

Open fire-places have, under most circumstances, been regarded as best adapted to ward purposes, and the additional means of ventilation they afford may be looked upon as especially useful in the case of wards occupied by patients suffering from infectious diseases. At least one such fire-place is found to be required for every 25 to 30 feet of ward length, and, where this limit is approached those fire-places which are provided with an air-chamber behind, by means of which warmed air from outside is passed into the ward, are, as a rule, used, because of the additional facilities they afford for maintaining a sufficient and equable temperature. Where wards exceed 30 feet in length stoves occupying a position in the central line of the ward and having an open fire-place both in front and behind, or similarly situated closed stoves so made as to throw warmed air into the wards are mostly used to maintain a fairly equable and a sufficient ward-temperature. Apparatus for combined warming and ventilation was only met with in one instance; it is referred to in connexion with the Children's Hospital at Pendlebury near Manchester.

The ward-space which should be allotted to each patient is a matter of first importance in a hospital where the patients are themselves centres of infection. In the Board's Hospital Memorandum it is stated that the ward-space for each patient should approach, as nearly as circumstances allow, to 2,000 cubic feet and 144 square feet of floor space. In most of the modern hospitals visited this amount of ward-space was nearly or quite reached; in a few instances it was somewhat exceeded; and, with one exception, I have found no reason to suggest that it should be exceeded. The exception relates to wards containing small-pox patients. In such wards a larger space between the beds seem indicated than is necessary for other patients, especially when many severe cases are under treatment. Under such circumstances it has been found difficult, even when the means of ventilation appeared ample, to keep the air in all parts of the wards quite sweet.

I am disposed to regard a standard of floor space as necessary to be appointed quite independently of the standard of cubic space, and I should not consider a material excess beyond the required 2,000 cubic feet per bed as compensating for a material shortcoming in the required 144 square feet of floor-space; nor yet should I regard a more ample floor-space as compensating for an insufficient cubic space. In other words, it appears to me that the height ought habitually to be about 14 feet in wards that are intended to have rows of beds on their two opposite sides, or if it be more than 14 feet, the space above that height should not be taken into account in reckoning the cubic space. There should also be at least 12 feet of wall space per bed.

The question as to the maximum of beds which should be allowed in any one ward devoted to infectious cases was borne in mind during the inquiry, but where large wards were met with they either lacked the adequate ward-space per patient, or they had not for some considerable time been in full use. Hence no experience on this point was available.

On several occasions the question arose whether children whilst in a hospital for infectious diseases needed the same amount of ward-space as is deemed necessary for adults, and it has appeared to me that the

Ward-space  
per patient.

Ward-space in  
the case of  
children.



subject called for consideration quite apart from the more general one as to the air-space which should be allotted to children in dwelling-houses, or in general hospitals. The circumstances, indeed, are not analogous. Having regard to the general experience acquired, I am of opinion that if any reduction in ward-space is made in the case of children, the reduction should be but small, and that in no case should the space for a child in an infectious hospital be less than three-fourths of that which is deemed necessary for an adult.

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In connexion with each ward there must be one or more water-closets or dry-closets, and a ward-sink. In all well-constructed hospitals both these apartments are contained in a building projecting from the main pavilion, being separated from the ward itself by means of a lobby, provided with a door leading into the ward, and having means of cross ventilation by openings in its two opposite side walls. As a rule windows, made to open, are relied on to secure this cross-ventilation, but they are, except in very warm weather, nearly always kept shut, and hence measures should in every hospital be adopted to ensure that this cross-current of air shall not be stopped by any action on the part of patients or nurses. This can be effected in several ways, as by the substitution of a fixed louvre, for a part of or for the whole of one of the upper panes of glass. The closets and sinks may conveniently be placed side by side with doors facing the door leading from the lobby into the ward. The partition above the closet and sink doors should rise to the ceiling so as to shut these offices entirely off from the lobby; whereas the partitions separating them from each other should not be more than about 8 feet high, so that, by means of windows placed in the opposite side walls of the projecting building, an independent cross-current of air may be secured through them. Where water-closets are used both the apparatus known as a "container," as also the "D trap" have in modern hospitals been carefully avoided, as tending to retain infection and to cause nuisance. Wherever any form of dry-closet is in use, it is fitted with a moveable receptacle, which needs to be emptied and cleansed at least once every day, the removal being effected through a doorway from without; this form of closet also requires to be subjected to frequent inspection, and an ample supply of the dry material used should be available for application. Dry earth and charcoal have both been found to answer this purpose. Ward-sinks require to be provided with means of flushing, and having regard to their use for ward slops, &c., water drawn from the taps with which they are fitted, should not be resorted to for domestic or other allied purposes.

Closets and  
sinks.

A separate bath-room is provided in most hospitals. If the bath be a fixed one, it is found expedient that the head alone should be fitted in contact with any wall, both sides being left free, in order that attendants may have easy access to the patient using it. A movable bath is, however, as a rule, found necessary as well as a fixed one, especially in scarlet-fever wards, where bathing often forms an important part of the treatment adopted. One movable bath at times serves all the requirements of a small pavilion, and in some of the smaller hospitals, where no separate bath-room has been provided, the bath is made to stand in a lobby over a sink, to which hot and cold water are laid on, and over which it can be emptied. Bathing in the wards is, however, not as a rule desirable, except when the circumstances of the patient render it necessary.

Bath-room.

In connexion with each ward-pavilion an entrance lobby and certain administrative apartments have in nearly all cases been provided. In the one-storied pavilions these occupy, as a rule, a central position, and

Administrative  
portion of  
ward-pavilion.

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the minimum they consist of is:—1°, a nurse's room fitted with fixed windows, commanding a view of either ward; 2°, a room in which to store such food and other articles as are in constant use; and 3°, a linen store. Where no additional rooms are provided, the nurse's room is often fitted as a ward kitchen, in which articles, such as beef tea, &c., can be cooked or kept warm, and it is also provided with a scullery-sink, an arrangement which is the less objectionable because nurses should not, unless under very occasional and exceptional circumstances, sleep in the rooms adjoining the wards. In the two-storied pavilions similar apartments occupy that end of the ward which adjoins the entrance lobby, and in which the staircase is fixed.

Furniture.

Much of the cheerfulness of a ward was often found to depend upon its furniture, which should throughout be simple, but also neat. Disregard of the latter condition often sufficed to make an otherwise well-appointed hospital very unattractive to the patients, and so tended to diminish its usefulness. Curtains, carpets, mats, &c., were, for obvious reasons, everywhere avoided.

Bedsteads.

Iron bedsteads are everywhere in use, and in well-administered hospitals the mattresses and beds are either thoroughly cleansed and disinfected at frequent intervals, or they are destroyed, after each use. Straw mattresses and beds of oat-chaff are at times used, the contents of the ticks being burned. Feather beds are also in use, the feathers being periodically purified with super-heated steam. In several instances I have met with iron bedsteads having wire coil or wire spring mattresses attached to them, so as to form a bedstead and mattress in one, a thin horse-hair bed being placed on the mattress. Whenever they have been in use for any length of time, I have found them to be highly spoken of both by the hospital staff, and the patients; they are stated to be far more cleanly than the ordinary bed and bedding, and also to be extremely comfortable. Such bedsteads with mattresses (*see* Plates Nos. XXI. and XLVII.) are in use at Cheltenham, at Manchester (Monsall Hospital), at Oldham, at Warrington, &c., and they appear to me to be eminently adapted to the purposes of a hospital for infectious diseases. The mattresses admit of being brushed free from dust, and washed *in situ*, and the horse-hair beds, which, owing to the elasticity of the mattresses, may be of less than the usual thickness, are easily dealt with in an efficient disinfecting stove.

Mortuary,  
laundry, &c.

The outbuildings connected with the hospitals visited were found as a rule to consist of a mortuary, wash-house and laundry, ambulance shed, disinfecting chamber, and a coal and wood store. In large hospitals a porter's lodge and additional out-buildings were also needed. In some instances, especially where existing buildings had been converted into hospitals, the position of the mortuary and of the laundry with regard to the ward-buildings was found to be open to grave objection. In most modern hospitals, however, they were very properly placed at a considerable distance both from the ward-pavilions and the administrative block. The need of having in connexion with the mortuary a post-mortem room, provided with an adequate supply of water and proper means of drainage, was noted in many instances. Further reference will be made to the question of ambulances and of disinfecting apparatus.

Water-supply.

The water-supply consisted as a rule of a constant service laid on to the premises either direct from the mains of a water company, or, where local wells were resorted to, from a tank reservoir on the premises. Means are also very generally adopted for keeping up an ample supply of hot water both day and night. Some hospitals have been built in localities where no other supply than rain and sea-water are available, and under these circumstances one or more tank-carts are needed, and



when the hospitals are in use a fresh supply is daily procured from the nearest suitable source.

Where public sewers of good construction are available, the hospital drains are always connected with them, and in no instance have I met with any ill results from the adoption of this plan. Instances will, however, be found recorded in which, for lack of due trapping between the sewer and the hospital drains, and for want of proper drain disconnection and ventilation, nuisance on the hospital premises and in the buildings has arisen. Special arrangements have in some instances been made for the regular and systematic flushing the drains, thus, at Tonbridge this is effected automatically by means of the "Flush Tank," designed by Mr. Rogers Field, C.E. Where no public sewer was available to receive the drainage, one of the dry systems of excrement removal has invariably been adopted, the liquid refuse being, according to local circumstances of soil, site, &c., dealt with either by sub-soil irrigation or by means of a cesspool. Where cesspools have been efficiently contrived they have been so constructed as to be impervious, their contents being periodically disposed of.

Hitherto the smallest amount of permanent provision which may be requisite has alone been referred to. In populous districts, however, it is found necessary to maintain permanent isolation accommodation for more than two diseases in both sexes, and one or more additional pavilions have to be set apart for that purpose. And even where the permanent provision for a number of patients is limited to two-ward pavilions, it has been found advantageous to secure, in a separate building, accommodation for occasional patients whom it might otherwise be impossible to receive when both ward-pavilions are in occupation. Thus occasions occur when it is advisable to receive one or more patients suffering from a third disease, as for example, small-pox or erysipelas, when two other diseases such as scarlet-fever and enteric fever, are already under treatment; it is also found to be at times almost imperative to provide separate accommodation for a noisily-delirious patient, or for one suffering from offensive sores or discharges; and the existence of a special isolation-ward for the temporary reception of a doubtful case of fever, may, on the one hand, enable an authority to stay the spread of infection which might otherwise remain uncontrolled, and, on the other hand, save a patient from contracting a disease from which he is erroneously supposed to be already suffering. And further, persons willing to pay all the cost of their necessary isolation often object to enter public wards. These several wants may most easily be met by the provision of a smaller pavilion, containing one or two small wards, to serve either as isolation wards or for the purposes of private patients. Examples of such provision will be found in the plans and descriptions of the hospitals for the Warrington urban and the Weymouth port districts.

In some districts, too, a special class of accommodation is required in order to prevent the spread of infection. Thus, at Folkestone, where infection is not unlikely to be imported by visitors, it was deemed most important, next to the erection of a detached small-pox hospital, to secure a building containing private apartments for the reception of a superior class of patients. The mode in which this result, which has there formed the first step towards securing fairly complete isolation provision for the ordinary infectious fevers, has been carried out, may be seen by reference to Plates Nos. XVI. & XVII.

The question of the cost of hospital construction can best be considered at this point. Wherever accurate information as to this could be procured, it has been recorded in the accounts which are given of the several

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hospitals visited, and I feel the more bound to refer the reader to these several descriptions, because of the difficulty I experience, owing to the numerous sources of fallacy, in grouping together the cost of any number of hospitals for the purposes of comparison. Thus the question of the cost of the site varies immensely according to the circumstances of the district, and whilst some authorities purchase a site outright, others only take it on lease, and this, owing to the generosity of the landowner, at times at a nominal rent. Others again possess land of their own, and hence the cost of the site does not form an item at all in connexion with the expenses of hospital provision. In the following Table, therefore, where the cost of certain hospitals is dealt with, this item is excluded from consideration. The cost of preparing the site is also subject to much variation, according both to the nature of the soil and to the surface configuration. Where a dry soil and a fairly level site can be obtained, the circumstances differ materially from those met with, for example, at Lewes and at Sheffield. The expenses of hospital construction depend also, amongst many other things, on the amount of floor-space and cubic space per bed, and were it not for reasons of convenience, the actual cost of the ward-pavilions would be best calculated on the basis of ward-capacity. But whilst adopting the ordinary method of speaking of cost per bed, this point must be taken into consideration and hence the details as to ward capacity are included in the Table relating to cost. And further, whereas the total provision it is intended to afford in many of these hospitals is not yet made, several of the larger items of expense incurred are for works of construction which will amply suffice for the increased number of beds which it is intended ultimately to provide. Thus administrative blocks have been built to serve the purposes, not only of existing ward pavilions but of future ones, and costly enclosure walls surround sites containing space for future ward extensions as well as for the present buildings. And once more, the expenses of some hospitals have been due, more than in the case of others, to the completeness with which they have been fitted with the requirements necessary to a well-appointed hospital. Thus, some are provided with excellent ambulances and efficient disinfectant stoves, whilst others have cheap and all but useless carriages and stoves, or else they have none at all; the cost of their provision being postponed. Some again are both well and completely furnished, others are very incompletely and at times very badly furnished.

Under such circumstances I necessarily find it needful to caution any reader against drawing rigid comparisons from the items I shall refer to, and I would in each case suggest reference to the detailed description of the construction and cost of the hospitals named. Subject, however, to this caution, I have selected a few hospitals of modern construction which have been well constructed of permanent materials, and I have grouped them together, so that their cost can to some extent be made subject of comparison. See Table, p. 19.

With regard to hospitals built otherwise than of stone or brick, I would only here refer to some of those which are of somewhat superior construction, the more so as the others met with are obviously not fitted to serve the purposes for which they were erected. Thus, at Bath, where nearly the whole ward accommodation consists of wooden pavilions, the cost per bed, after excluding the estimated cost of the site amount to about 100*l.*; and at Oldham, where the existing buildings are almost entirely composed of wood, but where this material is being abandoned as regards a new ward-pavilion, the cost per bed, exclusive of site, purchase of disinfecting stove, ambulances, &c., was 212*l.* At

Cost of  
permanent  
hospitals.

Cost of wooden  
hospitals, &c.



District.	Estimated Population.	Number of Beds.	Present bed-rate per 1,000 of Population.	Floor-space per Bed, in Square Feet.	Ward capacity per Bed, in Cubic Feet.	Cost of Hospital, excluding Cost of Site.	Cost per Bed, excluding Cost of Site.	REMARKS.
Berkhamstead, rural ..	11,000	8	0·7	144	2,000	£ 2,162	£ 270	The addition of the second pavilion will increase the number of beds to 16, the administrative building sufficing for the requirements of the increased accommodation, and the cost per bed will then amount to somewhat under 180 <i>l</i> . No ambulance or disinfecting stove as yet purchased. When the total of 56 beds has been provided, the cost per bed will be reduced to some 224 <i>l</i> .
Cheltenham, urban ..	44,000	32	0·7	Varies ; mean is 144	Varies ; mean is 2,300	11,121	347	Ward extensions are provided for.
Darlington, urban ..	35,000	44	1·3	144 to 175	2,000	10,123	225	Two other pavilions, containing together 22 beds, are to be erected. There is, also, a separate small-pox hospital with four beds, raising the present bed-rate per 1,000 population to 0·9.
Folkestone, urban ..	18,700	14	0·7	140	2,000	2,800	200	
Lewes, combined districts.	11,200	8	1·1	144	2,000	1,975	164	475 <i>l</i> . were spent in excavations, &c. in connexion with the site. There is as yet no disinfecting apparatus.
Middlesborough, urban	56,000	32	0·6	122 to 180	1,620 to 2,100	16,829	213	This hospital, though constructed for 32 bed, actually contains 48. The cost per bed is calculated on the number it should properly contain. Enlargement of several existing wards is provided for.
Sheffield, urban ..	285,000	64	0·2	138	1,810	19,785	309	The cost of preparing the site for the erections was unusually heavy, over 1,800 <i>l</i> . being thus expended.
Solihull, rural ..	20,000	12	0·6	144 to 156	2,000 to 2,184	2,892	241	Walls of pavilions less substantial than desirable. Some use was made of materials already in hand.
Tonbridge, urban ..	10,000	12	1·2	140	2,000	1,394	116	
Warrington, urban ..	42,000	28	0·7	144 to 175	2,058 to 2,529	6,555	234	Two more pavilions remain to be erected. Over 200 <i>l</i> . were spent in providing an efficient ambulance and disinfecting stove.
Weymouth, port ..	?	26	?	144 to 169	2,014 to 2,028	5,135	192	No enclosure wall deemed necessary. No disinfecting stove as yet provided.

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Cost of adapt-  
ing existing  
buildings to  
hospital  
purposes.

Southport, where a wooden-lined iron hospital has been erected, the cost per bed was 77*l.*; the thickness of the walls is however only 4 inches, and the ward-space per bed is insufficient.

Reference having also been made to alterations effected in existing buildings with a view of fitting them for the purposes of a hospital for infectious diseases, the two extremes in point of cost which have been met with may here be alluded to. At Salford a row of five houses, together with an adjoining site on which some cottages were built, and the cost of which could not easily be separated from the sum total, has, after numerous alterations, been adapted to the purposes of a hospital containing 50 beds. The cost per bed, including the recent necessary purchase of some adjoining property, has already reached 368*l.*, and this, although the ward-space is deficient and the provision for nurses is admittedly so imperfect that further buildings must be erected. On the other hand, an old parish "pest-house" has, after certain alterations, been adapted to the more pressing requirements of the Saffron Walden urban and rural districts, at a cost of 38*l.* per bed. The arrangements for the simultaneous treatment of two different infectious diseases are, however, imperfect; the cubic space per bed is insufficient; and hospital fittings, &c. are very rudimentary.

How far exist-  
ing buildings  
may be  
transformed  
into hospitals.

With regard to the adaptation of existing buildings to the purposes of a hospital for infectious diseases it may be opportune here to express some general opinion. The conclusion I have arrived at is, that such buildings, if sufficiently isolated, may, after certain alterations and additions, at times so far serve the more prominent needs of districts containing small populations, as to warrant their use for such purpose; but that they are not likely to secure that success in isolation which may be expected to follow on the erection of buildings specially adapted to the reception of cases of infectious diseases; and that they are never adapted to the requirements of the more populous, and especially of populous urban districts, where permanent provision for the simultaneous treatment of at least two different infectious diseases in both sexes must necessarily be made.

Workhouse  
hospitals  
transferred  
to sanitary  
authorities.

In a few instances detached hospitals for infectious diseases erected in connexion with workhouses have, with the sanction of the Local Government Board, been transferred from the poor law guardians to the sanitary authority or authorities comprised within the unions in question, for the reception of cases of infectious diseases occurring in all classes irrespective of the question of pauperism. In three of these instances the new arrangements, resulting from the transfer, had been in force for at least 12 months, and the districts concerned were visited with a view of ascertaining what degree of success had attended the use of this class of hospital for general sanitary purposes. At Goole the workhouse infectious hospital had been transferred to the Goole urban and rural sanitary authorities; at Settle it had been handed over to the Settle rural sanitary authority; and at Warwick to the authorities of the five urban and one rural districts comprised within the Warwick Union: and the details relating to the altered use of these hospitals will be found in the body of this Report. The Board would appear, in all instances where it has permitted the transfer, to have taken security that the building was substantially constructed; that its sanitary circumstances were either already such as are desirable for hospital purposes, or could at a reasonable cost be so made; and that the buildings could be adapted either with or without structural alterations, or by means of additions, to the simultaneous reception of at least two different infectious diseases in both sexes. The hospitals have also been capable of complete severance from the workhouses to which they had belonged; they have been so situated



with regard to the workhouse buildings that risk of infection to the latter need not be apprehended; and they have been provided with an entirely separate administration, a separate entrance from the public roadway, separate means of drainage, separate outbuildings to contain the laundry, mortuary, &c., and independent recreation grounds. These considerations all appeared to me to be very important, and as the result of the inquiry it became specially evident that the success attending the use of these hospitals by sanitary authorities depended, to an important degree, on the extent to which the buildings could be severed in the eyes of the general public from their former pauper connexions. Hence, under ordinary circumstances, a hospital which lies behind, and can only be approached by passing alongside, the workhouse buildings, and which is in part or in whole hidden from view by those buildings, as is the case at Goole, and to some extent at Warwick, is less likely to answer the several requirements of sanitary districts than one where the reverse conditions obtain. But where the conditions referred to as requisite can be obtained, experience tends to show that such hospitals may, with a fair chance of success, be utilised for the purposes of rural districts, and of small urban districts lying within easy distance of them.

In some of the districts visited, namely, in the Chester, Hartlepool, Manchester, Whitehaven, and Wolverhampton urban districts, the sanitary authorities had arranged with the governing bodies of general hospitals for the reception and isolation of cases of infectious diseases in those institutions. In some localities, as for example in Manchester and Southport, I learned that infectious patients had, under such an arrangement, formerly been admitted into the general body of the hospital buildings in question, but that this had been abandoned on account of the spread of infection to the general wards; and with one exception the buildings now so used were found to be either completely detached from the general hospital buildings, or to constitute separate wings having no communication with the main buildings. The exception referred to was at the Children's Hospital at Pendlebury, to which the Manchester Corporation send certain cases of infectious diseases. In this instance the "fever ward" constitutes a separate pavilion of admirable construction, but it is administered from an administrative block common to the whole hospital, and its communication with the other pavilions by means of corridors is unbroken. The frequent occurrence of scarlet fever in the general wards of this hospital is considered in detail in that part of this Report which deals with the means of isolation available for the city of Manchester, and I have felt bound to conclude, after making due allowance for the importation of infection by means of visitors, that this instance shows in a forcible manner the necessity for a complete severance between those portions of a general hospital into which a number of infectious cases are admitted, and the other hospital buildings. But where small-pox has been the infectious disease to be accommodated, I did not find that even a detached building sufficed to prevent the spread of disease to other parts of a hospital where the administration, laundry, recreation ground, &c. were common to the two sets of buildings. In no instance, except at the Chester Infirmary, where both a modern detached ward-pavilion and a detached dwelling-house are available for the reception of cases of infectious diseases, did I find in connexion with any general hospital proper means for the safe treatment at one and the same time of two infectious diseases in both sexes. Indeed, speaking generally, the arrangements available at general hospitals are not of such a character as to render it desirable that sanitary authorities should resort to them for the isolation of infectious diseases occurring in their

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tents.

districts. In some districts, as in the Derby and Leicester urban districts separate wards for the reception of certain infectious diseases form a noteworthy addition to the means of isolation available; admission to them being either free, or subject to the recommendation of a subscriber, or of a duly qualified medical practitioner.

Tents have in several instances been used as hospitals for infectious diseases, and descriptions of such use will be found as regards the urban districts of Grantham and Newark, and as regards the vestry of St. Pancras in London. In each of these instances the tents were ascertained to have been useful in the extreme, and they were found capable of resisting rain, wind, and cold to a degree which was not anticipated. But in order that they should do this they must be well constructed, and they must in every case have strong double walls and roofs. Tents other than those I have described were seen by me, and being of inferior construction they failed to secure to the inmates anything approaching the degree of comfort experienced in the districts adverted to.

Tents are, however, obviously not adapted to the colder months experienced in this climate, and for this reason alone they should never be relied on as affording permanent provision for isolation. Further, the construction of some permanent building should never be deferred on the ground that in the event of future emergency hospital tents can at a moment's notice be procured. Where the use of tents is in contemplation a proper site should always be available beforehand. Otherwise the difficulty of securing a site for their erection may, as was the case at Newark, cause such delay that by the time the tents are erected a considerable epidemic, instead of a few patients, may have to be dealt with, and the principal object which sanitary authorities should hold in view, namely, the possession in actual readiness of means for the early isolation of first cases of infectious diseases, will be defeated.

As a supplemental means of isolation well-constructed hospital tents may properly take their place, and they will be found specially useful during a considerable portion of the year for dealing with any exceptional outbreak, which the permanent accommodation provided is incapable of controlling; as also of taking the place of a second or third ward-pavilion, the construction of which has been for a time deferred.

In some port sanitary districts, as for example, in the Tyne port, floating hospitals are in use. If they can be placed where communication with them, both for the reception of patients and for administrative purposes, is not likely to be interfered with by weather, the more complete isolation which is secured by means of their use is an element well worthy of consideration. A land population is, however, not likely to use them so readily as they do hospitals on shore for the isolation of the ordinary infectious fevers.

It has been found by no means easy always to estimate in a satisfactory manner the degree of success which, in different districts, has attended the provision of means of isolation for infectious diseases. The test of such success is, however, certainly not alone, or even in the main, to be found in the number of patients admitted; it is rather in the proportion of first attacks, to the total attacks of infectious diseases which, occurring in any district, have been removed to hospital in a sufficiently early stage of the malady to have secured that district against extension of the disease. Thus, in the rural district of Berkhamstead only two cases of infectious disease needing isolation are known to have occurred during the first year following on the provision of a hospital. They were both isolated, and no spread took place; and this success must necessarily be deemed far to outweigh in value any results which might have been obtained in controlling and ultimately in successfully

Floating  
hospitals.Success in  
securing  
isolation.



stamping out such an epidemic as might have followed on a failure to isolate either of these two cases. Hence it may often happen that a hospital which best serves the interests of its district by insuring it against the spread of infection may be one into which a comparatively small number of patients has been admitted.

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Rarely, however, can the actual number of attacks of infectious disease be ascertained; almost the only exceptions being in districts where either a compulsory or a voluntary system of notification of such diseases is in operation. Special reference will hereafter be made to these districts, but apart from them, it has been found necessary to judge of the total amount of isolation carried out as regards any one disease by comparing the admissions to hospital with the deaths registered from that disease in the district in question. Accepting this as a rough test, the results obtained were found to have varied very greatly in different parts of the country.

Isolation  
success judged  
of by pro-  
portionate  
number of  
admissions.

In the first place a number of districts were visited in which hospitals existed but where either no use, or no noteworthy use, had been made of them. In most of these, as in the Derby, Norwich, Pemberton, and Scarborough urban, and in the Amersham rural, districts, the existing hospitals were found to have been hurriedly provided owing to the panic resulting from an existing epidemic, and to be hence either utterly useless and in decay, or to be so ill-adapted to the needs of the district that even under conditions of urgency, such as existed in Derby during 1880 when scarlet-fever was widely and fatally prevalent, they were not brought into use. In other instances, as at Blyth, Hartlepool, Maryport, Southend, and Stockton, the buildings used as hospitals were so unsuited to their intended purposes that no systematic effort was made to stay the spread of infection by the isolation of first attacks, and hence disease often spread beyond the limits of such control as isolation could materially influence. At Walsall, again, a hospital which might readily have been put to good service was found to have remained quite unused owing to the failure of the sanitary authority to keep it in readiness for the reception of patients. Indeed, with one single exception, namely at Aberdare, no hospital adapted to, and kept in readiness for the reception of the sick was found, which had not done some good in staying the spread of infection. In the latter district the reasons which led to a by no means unattractive and a well-appointed hospital remaining empty whilst infectious disease was widely prevalent in the district appeared to me exceptional. The result may to some extent have been due to the refusal on the part of the sanitary authority, under any circumstances, to allow a parent to accompany a sick child in hospital, and to the fact that whilst numerous notices were issued explaining how precautions might be taken against the spread of infection when patients suffering from infectious diseases remained under treatment in their own homes, no such publicity was given to the need for complete isolation in hospital and to the facilities for securing it; but after all the special aversion of the Welsh colliery and iron-working population of this district to resort to any sort of hospital, whether for general or for special diseases, must be accepted as the principal ground of failure. Fortunately, it is the only instance of the sort which I met with, and hence no general inference can be drawn from it.

Reasons for  
complete, or  
nearly  
complete,  
failure to  
secure  
isolation.

Between examples such as these and districts where a large amount of success has been obtained, as for instance, as regards the isolation of scarlet-fever in the Alcester, Leicester, and Warrington sanitary districts, almost every degree of success and of failure has been met with. The causes leading to these several and varying results, in so far as they have not already been explained by reference to ill-constructed, ill-devised, and

Varying  
success in  
securing  
isolation.

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Success in  
isolating  
small-pox, no  
test of general  
success in  
securing  
isolation.

Isolation of the  
several  
infectious  
fevers.

ill-looking hospitals, can, however, be better dealt with whilst considering some of the principal points relating to hospital management and administration which were inquired into. But it may here be stated that success in securing the isolation of small-pox must not be accepted as an indication that a similar success would attend an effort to stay the spread of any other disease by isolation. Thus, it has often happened that authorities who have by means of old houses and mere hospital sheds, succeeded in controlling and checking outbreaks of small-pox, have all but, or entirely, failed to secure a similar result, when another disease, such as scarlet-fever, has even more urgently called for the same preventive action.

Next to small-pox, scarlet-fever is the disease for the isolation of which most efforts have been made by sanitary authorities, and the success which has attended those efforts is often referred to in this Report. The various forms of continued fever, and notably cases of enteric fever, have also in many districts been somewhat extensively isolated. Diphtheria and erysipelas have occasionally been dealt with in isolation-hospitals, and at times efforts have been made to stay the spread of measles in the same way. There are, however, conditions which render attempts to deal with measles by means of isolation specially difficult. The stage at which the disease becomes infectious often precedes that in which it is recognised; the subjects of its attack are, as a rule, of exceptionally tender years, and a large proportion of cases never come under medical treatment at all. Notwithstanding its fatality,\* therefore, it can hardly be expected that hospital-provision by sanitary authorities will be deemed as pressing in the case of measles, as in some other infectious diseases.

Scarlet-fever is the disease for which isolation is most constantly and most urgently needed. The mortality it occasions exceeds that of any other communicable fever prevalent in this country, it is highly infectious, and there are no effectual means, apart from isolation, by which its spread can be stayed. Small-pox, the one disease which, if vaccination were properly carried out, should least call for hospital provision, may perhaps be deemed to stand next in order as regards the need for measures of isolation. In some towns typhus has prior claims to small-pox in this respect, and in all districts some provision should be made for the other continued fevers.

Regarding, however, scarlet-fever as the type of the infectious fevers calling for isolation-provision, it will be observed from the detailed statistics which are appended in the reports on the several sanitary districts, that those districts where the largest proportion of attacks was isolated, in so far as attacks can be judged of by total mortality, were those in which some early information was procurable as to the occurrence of the several attacks. In some districts this information was the result of a statutory enactment providing for the compulsory notification of infectious diseases; in others it was acquired by means of a voluntary notification of a somewhat similar character.

Amongst the towns where the compulsory notification of infectious diseases is in operation Leicester and Warrington were most noteworthy. In Leicester it was found possible to compare the results, as regards isolation and total mortality, of two epidemics of scarlet-fever which were, admittedly, of very similar severity, one occurring before and one after the registration of infectious diseases came into operation. The results are referred to on page 149, and they appeared at the date of

\* The deaths from measles in England and Wales during the ten years 1870-79 amounted to 87,163.

Isolation in  
scarlet-fever.

Compulsory  
notification of  
infectious  
diseases; its  
results:—  
Leicester;



my inquiry in Leicester to show how, with a hospital of by no means attractive exterior, the spread of the disease and the total mortality were diminished by reason of the early isolation effected as the result of information which during the course of the second epidemic was procured under the compulsory powers adverted to. The Act embodying those powers, however, only came into operation after the epidemic had commenced, otherwise the results obtained would doubtless have been even more satisfactory. At Warrington the working of a similar clause, together with others embodying special powers for dealing with epidemic diseases, resulted in the removal to hospital of nearly all the cases of scarlet-fever, which during many months previous to my visit had been constantly breaking out in different parts of the borough.

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(b) at Warrington;

[Both as regards Leicester and Warrington, however, later mortality statistics have shown that the diminution in the scarlet-fever prevalences was not maintained to the extent anticipated. See Appendices C and D, page 296. March 1882.]

The experience at Leicester was ascertained in an early stage of my inquiry, and it led me to visit all the towns in England and Wales where hospitals had been provided, and where powers for the compulsory registration of infectious diseases had been in operation for an entire year before the close of 1880, these being, in addition to Leicester and Warrington, the towns of Blackpool, Derby, Huddersfield, Norwich, and Nottingham. In none of the latter districts, however, did I find similar results. At Blackpool the position of the hospital behind a cemetery materially interfered with its use by the general public; and the inadequacy of the accommodation it afforded was such that the medical practitioners of the town did not feel justified, except under special circumstances, in recommending their patients to resort to it. At Derby the hospital provided by the sanitary authority was one of those hurried erections resulting from a state of unpreparedness to deal with an outbreak of small-pox by means of isolation, and the building was hardly, if at all, fit for use. At Huddersfield some increase in the amount of isolation effected and some consequent diminution in the spread of infection had resulted from the powers that the Corporation first obtained in 1876, but these had been to a very important extent nullified by the fact that the notification required was limited to persons "without proper lodging and accommodation enabling the case to be properly isolated," a limitation which was found to have received the widest possible medical interpretation. New powers had hence been sought and these only came into operation at the end of 1880. At Norwich the insufficiency of a hospital building, procured under very similar circumstances to those which led to the erection of the Derby hospital, was also the main cause of the failure to take advantage of the special powers acquired. At Nottingham the powers referred to had been obtained as far back as 1878, and although some three years had elapsed, I found, on the occasion of my visit, that the Corporation had failed to put them into operation.

(c) at Blackpool;

(d) at Derby;

(e) at Huddersfield;

(f) at Norwich;

(g) at Nottingham;

Voluntary  
notification of  
Infectious  
diseases.  
Results:—

The voluntary notification of infectious diseases was found to have varied much in degree, and in the extent of its usefulness. In many districts medical practitioners are ready to give information when cases of small-pox or typhus came under their notice, or again when very destitute persons in crowded dwellings suffer from any of the more common infectious fevers. It is, however, but rarely that any such notification is either general or is made at such an early stage of the disease, that the spread of infection can be arrested by prompt measures of isolation. Such notification also appears, as a rule, to be much more readily made by medical practitioners, when the medical officer of health for the district in question either devotes his whole time to his official duties, or



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(a) at Alcester ;

(b) Maidstone :

(c) at Saffron  
Walden.

General effects  
of the notifica-  
tion of  
infectious  
diseases.

Notification of  
infectious  
diseases in  
elementary  
schools.

Admission of  
young  
children.

limits the practice of his profession to a special class of cases, as, for example, to consultations. In the Alcester rural district much of the marked success in the isolation of scarlet-fever must be attributed to the fairly complete arrangements existing for the voluntary communication of early information as to infectious diseases to the medical officer of health. In this district the rural sanitary authority pay a fee of 2s. 6d. for each notification received, and the several medical practitioners do not fail to supply the information promptly, the result being that whereas 55 deaths from scarlet-fever were registered in the three years 1878-80, as many as 228 cases were removed to a hospital, which can neither be regarded as structurally attractive, nor complete in its internal arrangements. At Maidstone also, frequent intimation of the existence of infectious diseases has been received; no payment being made for it. The imperfect character of the temporary hospital has, however, materially hindered the more complete use to which such information might have been put. In the case of the Saffron Walden urban and rural districts, the spread of infection has in many marked instances been stayed by early isolation due to such voluntary notification made without a fee, but at the same time one of these two districts affords an example of the manner in which efforts at isolation, aided by such notification, can be all but frustrated by the failure of a single medical practitioner to supply the needed information.

Having regard to the information obtained as to the influence of the early notification of infectious diseases upon the prevention of infection by means of isolation, it appears evident that where a suitable hospital exists such notification, if general, cannot fail greatly to favour the object in view, and I can readily understand that in districts where compulsory powers to this effect are both put into operation, and followed up by prompt removal to hospital, the amount of accommodation necessary to meet the permanent isolation requirements will be distinctly less than that requisite for districts similarly circumstanced but having no such notification. This is indeed the experience reported to me at Leicester. On the other hand, failure to secure early information as to cases of infectious diseases has often been found seriously to hinder, and even altogether to prevent, the adoption of measures to stay the spread of infection by means of isolation.

In several districts a notification of cases of infectious diseases occurring amongst children attending elementary schools has, with the co-operation of the managers and teachers, been secured, and it has greatly facilitated the isolation and other action taken to prevent the spread of infectious diseases. In Carlisle, for example, such a system came into operation in 1878, and I was informed that, as the result of it, it had never been found necessary, since that date, to close a school because of the prevalence of an infectious disease. At Todmorden, on the other hand, the co-operation of the school authorities in this matter was refused, with the result that one school, at least, was soon after closed on account of the prevalence of scarlet-fever amongst the pupils, and amongst children generally.

Disinclination to provide a hospital for infectious diseases in certain sanitary districts, having been based on the fact that, whereas scarlet-fever was the disease most urgently calling for measures of isolation, this affection occurred mainly amongst children, and that mothers would not consent to their removal to hospital, some pains were taken in the several districts visited to ascertain the extent to which the isolation of young children had been found possible. In some hospitals the books were unfortunately so kept that evidence on this point was not forthcoming, in others it could only be procured for a short period of time, but whenever it was procurable and the total admissions had been



sufficiently numerous, the ages of the patients were carefully examined, and the result has been to show that the removal of children of tender years to infectious hospitals has been carried out on a far larger scale than was anticipated.

The following table summarises the principal information procured upon this point in such of the districts as afforded sufficient material for the purpose, and it will be seen that out of a total of 4,758 admissions from all causes and at all ages, as many as 2,673 of the patients, or 56 per cent., varied in age from a few months to 10 years; the rate varying from 33 per cent. in the Monsall Hospital near Manchester to 81 per cent. in the Alcester rural district:—

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Sanitary Districts.	Number of Patients at all ages.	Number of Patients of 10 years and under.	Percentage of Patients of 10 years and under to total Patients.
Alcester ... ..	220	179	81
Bradford ... ..	812	485	59
Grantham ... ..	66	49	74
Huddersfield ... ..	452	303	67
Isle of Thanet (combined) ... ..	138	83	60
Leeds ... ..	523	183	35
Leicester ... ..	346	251	72
Maidstone ... ..	48	24	50
Manchester ... ..	500	166	33
Oldham ... ..	200	118	59
Salford ... ..	2,263	710	56
Warrington ... ..	190	122	69

In numerous districts I was informed that success in securing the isolation of young children had by no means been obtained at once, but that it had been progressive, and that it had been in the main brought about by the steady diffusion of the reports made by previous patients as to the comforts and excellence of nursing obtained within the several hospitals.

The details with regard to admissions into each of the hospitals visited will be found in the separate reports as to the several districts, and it will there be noted that in nearly all the districts referred to it has been a practice to admit a mother with the sick child if isolation could not otherwise be carried out, but in many districts the stay of the mother was found to have been very limited, it having varied from a few hours to two or three days at the outside, except in cases where it was necessary to detain her in order to suckle her infant. The experience noted at Oldham, for example, is interesting on this point.

Admission of  
mothers.

The success obtained in the isolation of children appears the more striking because of the strictness of the regulations so often obtaining as to the admission of visitors to see the sick. In most hospitals occasional visits to the enteric-fever wards are permitted, but visitors are only admitted to see patients suffering from such diseases as small-pox, scarlet-fever, and typhus, when dangerous symptoms have supervened; notice of such illness being always communicated to the nearest known relative or friend of the patient concerned. Under these circumstances the visitors are, as a rule, required either to substitute their outer garments for some mackintosh or other impervious covering, or to have their clothing submitted to some process of "fumigation" or "disinfection" before leaving the hospital premises, a plan which has the unquestionable advantage of indicating to the public the views which are entertained by the hospital authorities as to the danger likely

Admission of  
visitors.

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to result from needless visits, and so of materially reducing the number of visitors. At Huddersfield even greater stringency is observed as regards visitors to any but the enteric-fever wards; all persons being required to submit to a bath whilst their clothing is being stoved, a regulation which, whilst not depriving persons of the opportunity of seeing their relations, has sufficed to do away with a large number of visits which might otherwise have led to the spread of infection. In many districts this restricted permission to enter the wards is supplemented by permission to see patients, at stated times and for brief periods, through the ward windows, care being taken on such occasions to prevent any communication between the visitors and patients. At the Monsall Hospital near Manchester, however, the exclusion of visitors from all but the erysipelas wards is nearly absolute; special facilities being at the same time afforded for the making of inquiries, without the necessity of a journey of several miles to the hospital, by means of a telephonic communication between the hospital and the offices of the Royal Infirmary in Manchester. Definite written regulations as to the visiting of patients were not often met with, but those relating to the Alcester rural and Bradford urban hospitals will be found in connexion with the reports relating to those districts. I have also, for the purposes of reference, appended those in force in the hospitals which are under the management of the Metropolitan Asylums District Board (page 294).

Compulsory  
removal to  
hospital;  
Public Health  
Act, 1875, s. 124.

Inquiry was also specially directed to the frequency with which it had been found necessary to resort to the powers given, either under section 124 of the Public Health Act, 1875, or under similar clauses in private Acts, for the compulsory removal of patients to hospital, and as regards every district where information on this point could be procured it has been recorded in this Report. One result of the inquiry has been to show how seldom such compulsory measures have been resorted to, the cases brought under my notice amounting, in all, to not more than some three dozen at the outside. In several instances, however, where persuasion has failed, either certain preliminary steps have been taken to procure a magistrate's order, or the order itself has been obtained with a view of proving that the sanitary authority had the power, in certain cases, of resorting to compulsion; and in the majority of districts one such exhibition of power has sufficed to obviate any further resort to it. It has also been found that when once an order has been obtained it has in nearly every instance been quickly complied with, and some of those who most objected to removal to hospital have, on the termination of their illness, expressed their gratitude that they had experienced the advantage of isolation and treatment in hospital. In one instance when a crowd hindered the removal of a patient, no further action was taken by the sanitary authority, because, on the advice of the medical officer of health who feared the effect which any further excitement might have on the patient, the intention to carry out the removal was abandoned. In two instances proceedings, resulting in the punishment by fine of the person obstructing, were, however, taken. In most cases where proceedings under section 124 of the Public Health Act, 1875, have been taken, the patient himself has had such improper lodging and accommodation as was deemed likely to have prejudicially affected his progress and recovery. But instances have been met with, as at Carlisle and at Southport, where the ground on which the order of a magistrate was obtained had reference not so much to the welfare of the patient but in one case in part, and in the other entirely, to the fact that the patient was so placed as to be a probable source of infection to others. So also compulsory removal to hospital under the provisions of special Acts, as for example, under the Huddersfield Improvement Act, 1876, has been carried out solely on the latter ground.



The question of demanding repayment of the expenses incurred in the maintenance of patients in hospitals for infectious diseases has received the consideration of all sanitary authorities who have provided such hospitals, and with but few exceptions, where admission is entirely free, some scale of charges has at some time or another been adopted. But it has nearly everywhere been found that the fear of having to repay the costs of maintenance, &c., has prevented the very persons who most need isolation when suffering from an infectious fever, namely, the wage-earning and the poorer classes not in receipt of poor-law relief, from availing themselves of the only isolation-provision which could be obtained, and it has hence become a practice to promise in advance either a partial or an entire remission of the amount which would otherwise fall due. Some authorities, feeling strongly that those capable of making even a trivial payment should be required to do so, have consented to receive partial repayment in very small weekly sums; but in most instances such payments have been found to involve more trouble than they were worth, and but little or no effort has been made to call them in. There are also instances where it is felt that since the entire cost of constructing the hospital, and also of maintaining both it and the staff, and all patients occupying public wards, is defrayed out of the public rates, any member of a ratepayer's family is entitled to use the means of isolation provided, free of cost. In other places it is further felt that all isolation carried out is for the benefit of the community at large rather than for that of the individual patient, and hence that the cost of it should in every case be borne by the community. This latter practice is indeed becoming more and more common. At present, however, in by far the majority of instances, the plan which has come to be adopted is to make no charge to the poorer residents in the district for which the hospital is provided, but to seek repayment, and if necessary to enforce it, under section 132 of the Public Health Act, 1875, when it is evident that the measures of isolation have been resorted to, not for the protection of the public, but for the benefit, whether pecuniary or otherwise, of the person sending the patient in. So also when special accommodation, as in a private ward, is required, repayment of all expenses is naturally demanded by the sanitary authorities concerned. Where hospitals do not belong to the sanitary authorities, but have been established by private bodies, payment is as a rule demanded of all or nearly all patients, as for example, at Cheltenham. These payments, however, rarely cover the total cost incurred by the hospital authority in the isolation and treatment of the patients in question. In certain instances where the institution is to a large extent supported by private contributions, the charge for maintenance is more frequently than not remitted either in part or entirely. Thus, in the case of the Bradford Fever Hospital, as many as 443, out of a total of 812 patients admitted in the three years 1870-80, were treated free of charge. In those cases in which sanitary authorities contract for the reception of patients into hospitals belonging to other bodies, the principles guiding them in seeking repayment from patients are very similar to those referred to as regards hospitals established by those authorities themselves.

The instances in which the social status of the patients isolated in hospital could be ascertained were not very numerous, owing, in many cases, to the imperfect records which had been kept. In a certain number of hospitals information on this point was obtained, and it will be found recorded in the description given as to those hospitals. By far the larger number of patients was found to have been derived from the wage-earning classes, such as labourers, artisans, mechanics,

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by or on  
behalf of  
patients;  
P.H.A. 1875  
sec. 132.

Social status  
of patients.

domestic servants, &c., that is to say, from the classes specially characterised as having no proper means in their own homes for the isolation of persons suffering from either of the communicable fevers, and through whose families the danger of the spread of infection is most general. The admissions have, however, been by no means limited to these classes; patients seeking isolation being also derived, especially in the well-constructed and well-administered hospitals, from the families of persons occupied in trade, commerce, and the several professions, the latter classes as a rule making payment for the accommodation afforded them.

Persons who are in receipt of relief from the guardians of the poor are, in many districts, provided with the necessary means of isolation in infectious hospitals attached to the workhouses. It is, however, becoming a common practice for the guardians to make an arrangement with sanitary authorities, having hospitals for infectious diseases, for the reception into those hospitals of out-door paupers within their districts, and at times of workhouse inmates also. As a rule, payment is made by the guardians for the maintenance of such patients, but in some districts the sanitary authorities regard any person, whether a pauper or not, who, when suffering from a dangerous infectious disease in their district, is without such accommodation as is necessary to prevent the spread of infection, as a source of danger to the community, which it is their province to deal with, and they hence receive all pauper patients free of charge.

Wherever any arrangement was found to exist for the reception of paupers into a hospital provided by a sanitary authority, inquiry was made as to whether it had acted as a deterrent to the non-pauper classes from seeking isolation in hospital, and if so under what circumstances the deterring effect had arisen.

With regard to out-door paupers the instances in which their reception into hospital has given rise to any complaint are but few, and any harm resulting has, in most cases, been more than counterbalanced by the good results which have followed in preventing the spread of infection. Indeed, I am of opinion that in most districts out-door paupers may reasonably be admitted into hospitals belonging to sanitary authorities, provided their identity with paupers is not made known. The patients should, where such an arrangement is possible, be so classified that the more well-to-do shall not come into needless communication with those who are in receipt of relief; paupers having ragged or dirty clothing should, as at Oldham and at Salford, be provided with suits belonging to the hospital; and the medical attendance on this class should not be carried out by the poor law medical officer, if such attendance, by being limited to paupers, tends to identify one section of the patients as such. As regards in-door paupers these conditions should be even more stringently adhered to, for the admission of a patient in a pauper uniform, and the fact of his being either waited on by a nurse sent from the workhouse, or attended by a practitioner who from the nature of his practice is specially identified with poor law work, has sufficed to raise objections by the non-pauper classes, both as to removal to, and as to remaining in hospital.

It should, however, be added that some sanitary authorities, and also the governing bodies of some private hospitals for the reception of infectious diseases, feel strongly that the admission of paupers, and especially of in-door paupers, is calculated to impair the usefulness of the means of isolation they have provided, and hence they make it a rule to refuse admission to any persons in receipt of relief from the guardians. In populous districts where the workhouses always contain



a large number of inmates, separate means for the isolation of cases of infectious diseases occurring in those establishments is very properly nearly always provided; but in the less populous, and especially in rural, districts, where the number of workhouse inmates likely to need isolation is but small, the total isolation-provision for the district may, for reasons of economy and general convenience, be under ordinary circumstances left in the hands of the sanitary authorities concerned.

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The administration of the several hospitals visited was found to vary very much, and in but few instances had any definite regulations relating to administration been laid down; I have, however, as regards hospitals belonging to sanitary authorities, endeavoured to learn generally the conditions of administration best adapted to the varying circumstances of the different sorts of districts.

Administration and medical attendance.

The experience acquired has shown that in every district some committee of the authority, or a joint board of the authorities, concerned should be appointed to control the affairs of the hospital, and to this body the permanent officers should be responsible. Where a hospital contains some 30 or more beds, some of which are in constant use, it will, as a rule, be found desirable that a resident medical officer should be appointed as general administrator and as medical attendant on the patients.

Where there is no resident medical officer, it is found necessary that some other medical practitioner should be appointed to take the general administrative charge of the hospital, and that he should be held responsible for the general working and the sanitary condition of the establishment. Indeed, the failure to appoint some such officer has, as at Goole, prevented the remedy of very defective sanitary circumstances, besides hindering isolation. In most districts this office is fulfilled by the medical officer of health, and, unless he resides at an inconvenient distance from the hospital, as sometimes happens in cases where one medical officer of health acts for a combination of sanitary districts, this officer is, as a rule, the most appropriate person for the duty. In some districts, as at Newcastle-upon-Tyne and at Oldham, the medical officer of health, though not engaging in private practice, also holds the post of medical officer to the hospital. This arrangement whilst often securing the isolation of patients who would not be sent to hospital if their admission involved their being transferred from the care of one medical man in active practice to that of another similarly circumstanced, may have the disadvantage in the case of a large or populous district of drawing the officer of health too much from the duties he has to perform in the latter capacity. Very frequently, however, medical officers of health who are not expected to devote their whole time to their official duties, are appointed both to the general administrative and the medical charge of the hospital, receiving for those duties either an annual honorarium, or fees depending in amount upon the number of patients. In districts where the number of patients needing isolation is not large, this plan is very generally found to answer well.

It is, however, often found desirable, in order to secure early isolation, to allow patients to be attended by medical practitioners of their own choice, and provided this is done at the patient's own cost and subject to such general regulations as to hospital and ward discipline as may be found necessary, the plan appears, especially in small hospitals, to have many advantages and but few drawbacks. There are, however, instances, as for example where a hospital is large enough to need the services of a resident medical officer, when such an arrangement is found to be inconvenient, and in such cases the only arrangement in this

Private medical attendance in hospital.



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nurses, &c.

direction which is often found admissible, is to allow patients, at their own cost, to call into occasional consultation or conference with the resident medical officer, some medical man of their own selection. In the early history of a hospital, when it is desirable to facilitate to the utmost removal to hospital, some arrangement of the above-named sort may, with great advantage, be resorted to, provided it does not interfere with the efficiency of the hospital administration.

In addition to the officer or officers having the general and medical charge of the hospital, it will always be found necessary to have one or more permanent officers. In a few districts where the use of the hospital is only very occasional, a suitable woman is appointed at a retaining fee of a few shillings a week to visit the hospital daily, to keep it and the bedding, &c. aired, and to have the building ready at any moment for the reception of patients, she acting as nurse, until one or more nurses, as the circumstances may require, are procured from some neighbouring establishment, such as a Nurses' Institute. The woman in question then, as a rule, remains to act as cook, &c., at an increased weekly salary. This arrangement is, however, not often feasible. More frequently a resident nurse is appointed. When no patients are under treatment she is provided at the hospital with lodging, fuel, and lights, together with such remuneration as suffices to maintain her in reasonable comfort. When patients are admitted, board, and as a rule, some additional remuneration, together with such assistance as may be necessary, are also provided. In some districts I found that the resident nurse or care-taker was expected to provide her own board when patients were under treatment as well as when the hospital was empty, an arrangement which I have reason to believe is, under ordinary circumstances, very undesirable.

Where well-constructed and properly fitted hospitals have been provided, it is necessary that a man as well as a woman should be in permanent residence, and it is a very general custom to appoint a man and his wife to act as care-takers on very similar terms to those under which resident nurses have been appointed. The man in some instances, as at Lewes and at Folkestone, is allowed to follow his usual avocation so long as the hospital remains empty, but on the admission of a patient he is required to devote his whole time to the service of the hospital, and he receives a corresponding increase in his salary.

But in more populous districts, where the hospitals are in constant or very frequent use, such an arrangement is insufficient, and, it is the general custom to provide as residents a matron, at least one nurse, one or more servants, and a porter; the staff of nurses and of hospital servants being increased as the number of patients increases. Instances of these various arrangements will be found in this Report, and, as far as possible, the cost of the maintenance of the several hospitals both when empty and when occupied by patients has been given.

All persons who come into close contact with the patients and whose duties lie in the ward-buildings should reside in the hospital, and all resident members of the staff should be required to cleanse themselves and to change their clothing before leaving the hospital premises whether for recreation or otherwise.

In every hospital a book should be kept containing information as to the circumstances of the patients admitted, the facts to be recorded in it being quite distinct from those relating to the history, symptoms, and course of disease, and to the treatment adopted. The absence of such a book, which may be termed "Admission Book," has been found, during the course of this inquiry, to have caused considerable inconvenience to sanitary authorities and their officers when desiring to collect informa-

Hospital  
records.



tion concerning the usefulness or otherwise of their hospital, and as I have frequently been requested to suggest the headings under which the needed information should be compiled, I have drawn up the annexed, as generally applicable to the purposes of a large number of the hospitals visited. For some hospitals part of the information would be unnecessary, for others additional headings would have to be inserted.

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Admission Book.

Number.	Date of Admission.	Name.	Age.	Sex.	Address.	Occupation.	Disease.	Medical Attendant.	Date of		Re-paid on behalf of Patient.		Remarks.
									Discharge.	Death.	Amount.	Source of Payment.	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

The name by which a hospital becomes locally known is at times a matter of some importance. All designations referring to diseases, such as Small-pox Hospital, or Fever Hospital, or those bringing the question of infection into prominence, such as Infectious Hospital, should be avoided. They have in several instances hindered isolation, and other names based upon the names of persons, localities, estates, &c., have with advantage taken their place. Designations such as Crozier Lodge at Carlisle, Delancey Hospital at Cheltenham, Monsall Hospital at Manchester, Giggleswick Hospital at Settle, and The Sanatorium at Folkestone, may be noted in this connexion.

Designation of hospital.

Hitherto each hospital has, for the purpose of convenience, been spoken of as belonging to one sanitary authority. This is, however, by no means always the case, and several hospitals were visited, which had been provided by two or more sanitary authorities, acting for this purpose in combination. Thus at Lewes two urban and one rural, and in the Isle of Thanet three urban and one rural, districts have combined in the provision of means of isolation. The most remote of the urban districts in the former instance is only about one mile from the hospital, in the latter it is three miles distant, and some of the more populous localities in one of the rural districts are four or five miles away. There had not been, at the date of my visit, much occasion for the use of the hospital at Lewes, and in all the other districts where a hospital had been provided jointly by several authorities, there were circumstances attaching to the building, the site, or otherwise, which tended to hinder its use. It is, therefore, difficult to speak with authority as to the degree to which the extent of area in combined districts interferes with the use of the hospital, but reference to the several descriptions given of the hospitals so provided will, I think, bear out the remarks which have been made in an earlier portion of this Report on the question of distance in relation to site.

Hospitals for combined sanitary districts.

In some of the earlier instances of combinations for this purpose, a hospital committee, consisting of a certain number of members of each

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sanitary authority, was formed under an agreement, the committee having certain defined powers and duties, including authority to levy contributions on the constituent bodies for the purposes of construction, maintenance, &c. Many inconveniences, however, attended this arrangement, and it was felt that the object in view would be more simply and efficiently attained if a Joint Board were duly constituted under sections 279 and 280 of the Public Health Act, 1875. By such an arrangement all difficulty as to securing a satisfactory audit of accounts is removed; and the Joint Board acquires certain important powers, such as the right to hold lands, to enter into contracts, to issue precepts, and to sue, which are not possessed by a joint committee. In the more recent instances of a combination of urban and rural districts for this purpose such a board has therefore been appointed, and its powers and duties have been defined, under a Provisional Order of the Local Government Board. The contributions of the various authorities to the hospital purposes are as a rule based on the rateable value of the respective districts; at times, however, both population and other circumstances have also to receive consideration in apportioning the costs both of construction and of maintenance. The number of members which each authority is entitled to elect to the Joint Board has also been determined by very similar considerations.\*

Some sanitary authorities having no hospital of their own arrange either with other authorities who, in adjoining districts, have provided means of isolation, or with the governing bodies of other hospitals for infectious diseases. Instances of such an arrangement entered into by one sanitary authority with another will be found at Middlesborough, Todmorden, and at Warrington. Amongst the reasons for the complete failure of this plan at Middlesborough and at Todmorden must be included 1<sup>o</sup> the distance at which some of the localities concerned are placed, from the hospital; and 2<sup>o</sup> the aversion which persons in one town or populous place have to removal to any other town, even though it is not far distant. But the character of the financial contract, when it resembles that in force as regards the Middlesborough Hospital, has, I think, an undoubted influence in preventing any proper use of the hospital by the several contracting authorities. It was naturally felt by the Middlesborough Corporation that if neighbouring sanitary authorities desired to use the hospital provided by the borough they should bear a reasonable portion of the cost of construction and of the expenses incurred in maintaining the hospital, in addition to the cost incurred in the treatment and maintenance of the individual patients. It was therefore determined that this charge should form a portion of the weekly sum payable on behalf of each patient, and arrangement was consequently made for the admission of patients at a rate of 2*l.* 10*s.* per week. It is however obvious that this sum, though only sufficing to cover the various charges which ought properly to be borne by the several contracting authorities, becomes considerable when it has accumulated for several weeks, as for example would be the case when the isolation of two or three children suffering from scarlet fever during a period of six or eight weeks had to be paid for, and it is to a great extent due to this, that this system of payment when adopted has, in no inconsiderable degree, hindered isolation. In other instances, as in the case of the arrangement existing between the Lymm urban and the

\* See following Acts confirming Provisional Orders for constituting Joint Hospital Districts:—Sittingbourne and Milton (1879), 42 & 43 Vict. c. 86; Henley, Stoke, and Fenton (1880), 43 & 44 Vict. c. 58; Rochester and Chatham (1880), 43 & 44 Vict. c. 178; Bromley and Beckenham (1881), 44 & 45 Vict. c. 63; Lanchester District (1881), 44 & 45 Vict. c. 70.



Warrington rural authorities on the one hand, and the Warrington Corporation on the other, the method of payment to the latter authority for the use of their hospital has been determined in a different manner. The total cost incurred in maintaining the hospital when empty, together with interest on the outlay incurred in its construction, was calculated to amount to 13% for every 1,000 of the population in the three sanitary districts, and the populations in the Warrington rural and the Lymm urban districts being estimated as 10,000 and somewhat under 4,000 respectively, annual payments amounting to 130% in the case of the Warrington rural, and 50% in the case of the Lymm urban, districts were required, in addition to a small weekly sum to cover the expenses involved in the maintenance and treatment of each patient sent in. This arrangement appears, so far as the method of payment is concerned, very preferable to that obtaining at Middlesborough, for it gives each contracting authority a direct interest in making use of the privileges for which it has to pay, and had the distance of the Warrington hospital from some outlying portions of the districts of the two contracting authorities not been so considerable, the success which has attended the use of that hospital by those authorities would doubtless have been even greater than it has been.

Apart from the isolation of patients actually suffering from one or other of the infectious fevers, certain incidental uses have been made of some of the hospitals visited; such as the temporary isolation, during a probationary period, of persons who have been in contact with infection, and there can be no question but that such action has in several instances, as for example at Dover, Leicester, and Lewes, tended to prevent the spread of infectious disease.

Incidental uses  
of infectious  
hospitals.

With a view to the safety both of the patients to be isolated and of the general public, it is important that a proper ambulance should be invariably provided. In the "Hospital Memorandum" issued by the Board, the following points are referred to in connexion with the provision of ambulances:—

Ambulance.

1. If the ambulance be intended only for journeys of not more than a mile, it may be made so as to be carried between two people, or it may be on wheels and be drawn by hand. If the distance be above a mile, the ambulance should be drawn by a horse. Every ambulance on wheels should have easy carriage-springs.
2. In the construction of an ambulance, special regard should be had to the fact that after each use it has to be cleansed and disinfected. The entire interior, and the bed-frame and bed, should be of materials that can be washed.
3. The ambulance should be such that the patient can lie full length in it; and the bed-frame and bed should be movable, so that the patient can be arranged upon the bed before being taken out of his house.
4. With an ambulance there should always be a person specially in charge of the patient; and a horse-ambulance should have a seat for such person inside the carriage.
5. After every use of an ambulance for infectious disease, it should be cleansed and disinfected to the satisfaction of a medical officer.
6. Both in very populous districts, and in districts which are of very wide area, it may often happen that more than one ambulance will be wanted at one time; and, in any district, if more than one infectious disease is prevailing, there will be an evident sanitary advantage in having more than one ambulance for use.

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In amplification of these points I would merely add, 1<sup>o</sup> that it is desirable to have fitted behind the driver's seat a sheet of glass through which an outside attendant may be able to keep the patient in view; 2<sup>o</sup> that a box or case containing a stimulant, which it might be necessary to administer during the journey, should be provided in connexion with the conveyance; and 3<sup>o</sup>, I would desire further to impress upon sanitary and hospital authorities the extreme importance of always placing the ambulance, especially during its journeys from and to the hospital, in charge of a person who can be fully trusted to permit no communication with persons on the route.

In the body of this Report several ambulances are described (see plates, Nos. XXV., XXVI., XXX., XLVIII.).

Means of dis-  
infection.

The arrangements for preventing the spread of infection can, in no district, be deemed complete, unless efficient means for the disinfection of such infected bedding, clothing, and other articles, as will necessarily exist both in the hospital itself and in houses where infectious diseases are prevalent, have been provided. In most districts some means of disinfection has been provided at the hospitals belonging to the sanitary authorities; it is, however, often limited to a chamber in which some gas such as chlorine or sulphurous acid is disengaged, and as this cannot be trusted to penetrate into the interior of many of the infected articles its use is very limited, and it has often to be supplemented by the destruction of some of the articles. In all the districts where any special apparatus was found to have been provided, the disinfecting agent which was relied on was dry heat, and a considerable number of stoves, in which articles could be subjected to a high temperature were met with. They have all been referred to in the descriptions of the several hospitals visited.

In estimating their value, regard has been had to the following, amongst other, points. In the absence of trustworthy information as to the minimum temperature which suffices for the destruction of the infective material of the several infectious fevers, a disinfecting stove should admit of articles being subjected in it for a lengthened period, to the highest temperature which is practicable without risk of damage to the articles in question. This temperature should also be equally distributed throughout all portions of the stove, and it should be capable of thoroughly penetrating articles such as beds, pillows, &c. With a view to this result, means for the escape of moisture from the stove should be provided, and a current of heated air should continuously pass through the infected articles.

Judged by these requirements many of the stoves were found to be not only useless, but to constitute a source of danger by reason of the false sense of security which attended their use. Amongst those in which these results could be obtained, there were also different degrees of merit, some of them producing the results with unvarying certainty and a minimum of trouble, others only as the result of incessant and prolonged supervision and a large consumption of fuel. The stoves in use at Manchester and at Nottingham may be contrasted in these respects. To the stove in use at the latter place, and which was designed by Dr. W. H. Ransom, F.R.S., I would draw special attention as embodying, in the best known manner, the several requirements of a dry-heat disinfecting stove, and as possessing certain incidental advantages which constitute it by far the most efficient disinfecting stove met with during the course of this inquiry. Amongst the more marked of its advantages is its automatic action, by means of which great economy in fuel and in skilled supervision is saved. This stove is now



in use in a large number of sanitary districts, and the results following its use at Birmingham, Nottingham, Warrington, and Wigan may be referred to in this connexion.

In nearly all the districts where efficient means of disinfection are available, they are put to a large and a steadily increasing use, as may be seen by reference to the descriptions relating to Birmingham, Manchester, Nottingham, Oldham, &c. The measures of disinfection, following on the outbreak of infectious disease, are, however, in many instances not confined to articles of bedding, clothing, &c., but they include the cleansing, lime-washing, and disinfection, so far as this is possible, of the rooms, and at times of the houses, from which the patients have been removed. In this and in other respects, many hospitals for infectious diseases were found to be centres of sanitary work for preventing the spread of infection, quite irrespective of that which is involved in the isolation of the individual patients.

It may also be found desirable periodically to disinfect certain of the hospital wards and apartments; this being specially requisite when it becomes necessary to use a ward-pavilion, hitherto reserved for cases of one of the infectious fevers, for patients suffering from another of those fevers; and in connexion with this subject I have appended to this Report (Appendix B., page 294) the "Instructions for the Disinfection of the Homerton Fever Hospital," which were drawn up by Dr. Alexander Collie, and used by him under circumstances similar to those adverted to.\*

Very special attention was directed during the course of my inquiry into the influence exerted by hospitals for infectious diseases upon the neighbourhoods in which they were situated. Their influence for good in affording means for the immediate isolation of any cases of infectious diseases which might occur has already often been referred to. A few typical instances of such influence may, however, with advantage, be here recalled. In the Alcester rural district I learned the following, amongst numerous other instances in which the early removal of scarlet fever from houses containing children unprotected by previous attacks, had prevented any spread of infection. On three different occasions pupils suffering from that disease were removed from boarding schools and no second attack took place. An attempt, however, to isolate a case in one of those establishments on another occasion led to seven other attacks. Before the erection of the Delancey Hospital at Cheltenham, small-pox had on numerous occasions been somewhat widely spread in the town. In 1858 it caused 52 deaths; 12 fatal attacks occurred in 1861; and 32 in 1865. During the six years, however, which had at the date of my inquiry elapsed since the provision of adequate means of isolation for this disease, small-pox had on 12 different occasions been imported into the town. All the important cases were at once removed to hospital, and in no single instance had the disease spread beyond the house where it first broke out. In the Solihull rural district I learnt that, excluding either one or two cases in which a second attack of scarlet fever had been contracted before the removal of the first patient affected, no spread of that disease had ever resulted when isolation in hospital was effected. And again, at Warrington, 52 cases of scarlet fever had within a few months of my visit, been removed from 44 houses, in which there were as many as 101 children not protected by a previous attack of the disease. And yet in only one house did a subsequent attack occur. These and

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Disinfection and cleansing of houses, &c.

Disinfection of wards, &c.

Influence of infectious hospitals on the surrounding neighbourhood.

\* Since writing the above I have information from Dr. Collie to the effect that on two occasions when these measures of disinfection had been carried out before fever cases were admitted to wards that had been used for small-pox, occurrences of small-pox amongst the fever patients had taken place under circumstances which made it impossible to assert that they were not the result of retained infection.



similar experience leave the question as to the benefits which are conferred upon a district by its possession of a suitable hospital for infectious diseases, beyond a doubt. Instances were, however, met with in which an influence for evil had been either suggested or suspected.

With a view of eliciting trustworthy information on this latter point inquiry was made in all the districts visited, not only whether the several hospitals had been known to have led to the spread of infection, either directly or indirectly, but whether any such spread had on any occasion been either suggested or suspected, and in every instance in which even a rumour of such spread was heard of, it was investigated, the facts being recorded in this Report. Indeed, rather than set aside as valueless even the most trivial information obtained on this point, details have been given as to the alleged spread of infection in certain instances, which to some observers may appear quite superfluous. Thus, when an attack of any infectious fever has followed upon an illicit interview with a hospital patient, the circumstances have been recorded, provided the occurrence took place within such a date of the interview as would reasonably coincide with the incubative period of the disease in question, even though it was known that the individual affected was in other, and in more likely ways, exposed to the infection of the disease contracted.

In dealing with this question it will not be necessary here to advert at any length to those instances in which infection has presumably been communicated as the result of some faults of administration. Thus cases of infection contracted during ill-regulated hospital visits, or as the result of illicit communication with hospital patients, or in the homes of non-resident hospital scrubbers, &c., or as the result of contact with infected ambulances, such as is supposed to have taken place in connexion with the Bradford, Chester, Folkestone, Huddersfield, Isle of Thanet, and Saffron Walden hospitals, call for no detailed comment; for even admitting that the infection was in these instances rightly attributed to the hospitals, the several sources of danger only need to be known in order to be avoided; indeed in a well-administered hospital they would not arise.

As regards other means by which hospitals may be regarded as tending to the spread of infection, it will be desirable to refer to small-pox apart from the other infectious fevers.

With respect to the latter diseases, and especially to scarlet fever, typhus, and enteric fever, I have been unable to ascertain, as the result of every inquiry, that any spread of infection has resulted in the vicinity of any of the hospitals visited, which apart from an attack resulting from a visit to patients under treatment could in any way be attributed to hospital influence. On the contrary many instances have been met with in which the existence of cases of these fevers near the hospitals in question could not fail to have become known, and yet in these very instances it so happens that there has been a marked immunity from these diseases in the localities referred to. On this point I would refer to the facts recorded as regards Newcastle-upon-Tyne, Sunderland, and Warrington, where information as to the distribution of cases of infectious diseases was forthcoming. At Newcastle-upon-Tyne (see page 201) the hospital premises lie within 34 feet of a poor and crowded neighbourhood containing a large proportion of young children, and although during the three years 1877-79, 33 cases of scarlet fever, 37 of typhus, and 48 of enteric fever came under treatment there, no cases of typhus or enteric fever could be heard of as having occurred amongst a population of 632 persons in the immediate vicinity of the hospital. It is true that 20 cases of scarlet fever took place in the locality in question, but of this number only six attacks occurred in that half of the district

Spread of  
scarlet fever,  
typhus, &c.  
from hospitals,  
considered.



which was nearest to, and within 400 feet of the hospital. These six attacks took place in three houses, but two of the houses were affected at a time when the hospital had for many weeks been entirely free from scarlet fever, and the single attack in the remaining house occurred when only one scarlet fever patient was under treatment in the hospital. As many as 1,150 cases of this disease came under the notice of the medical officer of health in the borough generally during the same period. Two elementary schools also stand near the hospital premises, one within 45 feet, the other within 100 feet of it, but in both of these institutions the very trivial amount of infectious disease which had prevailed was known to have had its origin elsewhere.

At Sunderland (see Plate No. XXXVII., page 258), the value of the information procured on this point was lessened by the fact that it was only available for the one year preceding my visit. It may, however, be well to refer to it. In that town the hospital for infectious diseases is on two sides surrounded by a thickly inhabited district, it was ascertained that during the year 1878 only four cases of scarlet fever, one of typhus, and one of enteric fever had occurred amongst a population of over 1,200 persons living within a radius of 200 yards of it; whereas the proportion of attacks to population from these three diseases was twice as great in two other specified districts of the same area, having much larger populations of the same character, but being respectively 1,000 yards and 1,500 yards distant from the hospital. So also, in a population of 309 persons residing in the narrow street leading up to the hospital gates, only two cases of scarlet fever occurred. During the same year 31 cases of scarlet fever, 5 of typhus, and 10 of enteric fever came under treatment in the hospital, and as many as 591 cases of scarlet fever were reported as having taken place in the borough.

At Warrington (see page 278) the experience available was also for a limited period. In that borough a population of 1,082 persons lie within 550 feet of the hospital premises, and one end of a street occupied by the working classes comes into actual contact with them. Since July 1879, when the notification of infectious diseases became compulsory in the borough, an accurate record has been kept as to the localities in which such diseases have appeared, and I ascertained at the date of my inquiry there, that in no instance had a case of either of the infectious fevers treated in the hospital occurred amongst this population between the date named and the end of 1880. Later information shows that between June 1880 and the end of December 1881 as many as 282 cases of scarlet fever were admitted into hospital, the number of patients simultaneously under treatment during four of these months varying from 40 to 60. During the whole of the 19 months referred to—and excluding one attack known to have been imported—only three attacks of scarlet fever were notified as having occurred amongst the 1,082 persons living near the hospital, whereas as many as 424 were reported from the borough generally; the rate of attack per 1,000 inhabitants being 10·2 for the borough and only 2·8 for the special area about the hospital. And not only so, but two of the three attacks in the special area occurred when the hospital was comparatively empty, and in both cases other and more probable sources of infection than hospital influence had been in operation.

These instances which may be taken as characteristic of the experience gained during the course of my inquiry will tend to show that in well-administered hospitals having an open space of some 40 feet between the hospital wards and any neighbouring thoroughfares or dwellings, no risk of the spread of infection from scarlet fever, typhus, and enteric fever need be apprehended. But in none of the instances recorded was



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the available experience spread over any long term of years, neither did the patients under treatment from any of the diseases named for any length of time exceed some 40 in number. Hence, with a view of ascertaining whether the experience gained in this respect was different in the case of large aggregations of patients, the results of an investigation which had been carried out by Mr. Shirley Murphy whilst resident medical officer to the London Fever Hospital, and which was renewed during 1881 for the purposes under consideration have, with his permission, been added to this Report (see page 157).

From Mr. Murphy's Report the following facts are gathered. 1°. A not inconsiderable population in Islington has for many years past resided in houses at a distance varying from 36 feet to 71 feet of the London Fever Hospital buildings, from 49 feet to 80 feet of the wards themselves, and from 22 feet to 33 feet of the hospital gardens used by the patients; the gardens belonging respectively to the houses and to the hospital being only separated by a boundary wall. 2°. For a term of several years there were under treatment at one and the same time in the hospital wards from 100 to 200 typhus patients, along with a score or two of scarlet fever and enteric fever patients; during several months of this period, and by the aid of special temporary provision, accommodation was found for the simultaneous isolation of from 200 to 300 relapsing fever patients; and during a later period the hospital being used for little but scarlet fever and enteric fever, it has contained at one and the same time from 80 to 100 scarlet fever and some 30 to 40 enteric fever patients. 3°. As regards the relation between the two things as measured by such inquiry as it was practicable to make the following appear:—Not a single case either of typhus or relapsing fever could be heard of as having occurred amongst the population in question. As regards scarlet fever and enteric fever there had been certain cases in the adjoining houses during the years covered by the inquiry. Making, however, such estimate as he could respecting the number of such cases to be expected in this population, according to the prevalence of scarlet fever and enteric fever about London generally, Mr. Murphy judges that the observed number and the estimated number are practically identical.

With regard to some other infectious fevers such as diphtheria, measles, &c., no sufficient information was obtained to warrant any decided conclusion as to the spread of these infections being arrived at as the result of this inquiry, but there can be little doubt that these diseases may be judged of in the light of the experience gained with respect to those which have already been considered.

As regards small-pox two instances were met with in which the spread of that disease was alleged to have been due to hospital influence properly so-called. In both instances the hospitals in question were buildings which ought never to have been used by a sanitary authority for the isolation of cases of infectious diseases, forming part as each one did of a row of dwelling-houses, and being in each case so situated that the patients had to be removed from the ambulances in the public thoroughfare. At Maidstone the circumstances of an outbreak which affected two houses close by the hospital, and which was supposed to have been due to hospital influence, was carefully investigated by the medical officer of health. In the first case the proximity of the house affected to the hospital may have led to the spread complained of, but as the attack in question followed within about a fortnight of the admission of two small-pox patients, the influence of the ambulance as a cause of spread has also to be considered. Besides the two patients referred to, only one other small-pox patient was at the time in hospital. As regards the second instance there are some grounds warranting the conclusion

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small-pox  
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that the exposure of infected bedding, &c., in the hospital garden, and within a short—but in this case somewhat uncertain—distance of a frequented path and of the windows of dwelling-houses, may have led to the spread of infection.

At Stockton a similar result, in a hospital having no proper medical supervision, may in one instance have been due to the exposure of infected bedding within some 5 feet of the window of a room occupied by the person attacked. In a second instance the disease was probably contracted as the result of close contact with the ambulance during the removal of patients into the hospital, and the only other case brought under notice could in no way be connected with the hospital.

It must however be remembered that at Stockton the disease contracted was somewhat widely prevalent, that at Maidstone scattered cases had occurred, and that sources of infection, other than the hospital, must hence have existed. As regards the Maidstone cases, however, the spread of disease did, in point of date, correspond with certain processes at the hospital by which the diffusion of infection was rendered possible.

On the other hand, many instances have been met with in which small-pox has been treated in well-constructed and well-administered hospitals, and no spread is known to have resulted. But in all the instances as to which trustworthy information could be obtained, the number of cases under treatment at any one time was but small, and hence evidence was further sought in hospitals where a considerable number of patients were grouped together. Unfortunately no recent evidence was forthcoming, and such as was obtained at Leeds and at Nottingham may possibly be vitiated by lapse of time.

At Leeds, where the House of Recovery lies in a populous district and within a distance varying from 36 feet to 200 feet of neighbouring houses, as many as 118 cases of small-pox came under treatment in 1871, and although the hospital authority would gladly have availed themselves of even a suggestion as to the spread of infection to the surrounding dwellings, in order to close their hospital against small-pox, no rumour of such an event was even heard of.

At Nottingham 234 cases of small-pox were received between December 1871 and February 1872, into a new wing which was immediately continuous with the workhouse buildings, and which was on one side bounded by a narrow thoroughfare; the windows of the small-pox wards and of the opposite dwelling-houses being only 44 feet apart. Every effort was made to secure trustworthy information as to the spread of small-pox either into the workhouse or the streets adjoining, both by application to the officers of the sanitary and poor law authorities, and to medical practitioners then resident in the neighbourhood; but no such spread could be heard of. On the contrary, the dwellings in the vicinity of the ward buildings appear rather to have exhibited immunity from the disease.

Negative evidence, however, of this character loses much of its value in the case of small-pox by reason of the large amount of vaccination which is carried out in most districts when small-pox becomes prevalent. That this source of error must be taken into consideration with respect to Nottingham is within my own personal knowledge, and in forming any conclusion as to the small extent of the spread, if any such spread took place, under circumstances such as obtained at Maidstone, regard must be had to the same point. Thus, in the latter place, nearly all the residents in the immediate vicinity of the hospital were found to have been protected against the disease either by vaccination or by a previous attack of small-pox.

Owing to the very limited information on this point which was elicited during the inquiry, I found it difficult to draw any further conclusion



than that conditions of hospital construction and administration which have sufficed to prevent the spread of scarlet fever, typhus, and enteric fever, are not proved to be adequate to prevent the spread of small-pox. It may be worth noting in this connexion that in all the instances in which the latter disease was alleged to have been spread beyond the hospital limits, the other infectious fevers had been under treatment, and no such spread had taken place.

In regard of the possible extension of small-pox from hospitals to the houses adjoining them, it will be observed that this Report, dealing only with the provinces, does not profess concern with the allegations that have been made against certain London small-pox hospitals; and inferences from the Report would in any case have to be cautiously made when it is sought to apply them to London. But more than this:—at the beginning of the present year while this inquiry was in progress, statements were made, on authority that claimed to be regarded, that occurrences of small-pox in certain parts of London were related to the presence there of the hospitals of the Metropolitan Asylums Board. Under these circumstances the Local Government Board were desirous of getting exact information as to the facts, and desired that medical inquiry into the alleged experiences should be extended into London. Accordingly Mr. Power was associated in my inquiry for the purpose of investigating with all possible minuteness such evidence as might be forthcoming from the experience of one of these institutions. The hospital to which Mr. Power's inquiry was directed was that at Fulham (see page 302), and his Report not only confirms the suspicion to which the experiences of Maidstone and Stockton had given rise, but suggests a faculty of extension, under certain circumstances, of small-pox from hospital to surrounding houses, that had not before been recognised.

Amongst the points to which but little or no reference is made in this Report, is that of the mortality occurring amongst the patients isolated in hospitals for infectious diseases.

It is true that in many districts I was assured that the rate of mortality in the hospitals had been far less than that obtaining outside, but it was quite impossible, in nearly all these instances, to ascertain the number of attacks which had occurred elsewhere than in the hospital, and even where this could be learnt no trustworthy information was forthcoming as to the intensity of the attacks amongst the two classes of patients. So also, where a comparatively large mortality had been experienced, it was ascertained to be due to the fact that the hospital administration and treatment were so fully trusted that the more severe cases were sent in, whilst the milder attacks were treated at home. In the case of small-pox patients the amount of protection afforded by vaccination to the patients in and out of hospital respectively constituted another source of error. Under these circumstances it was found in an early stage of the inquiry that any comparison as to the death-rates amongst the patients in the several hospitals, or as regards patients treated respectively in hospital and at home, would be extremely fallacious, and hence details as to this are only recorded in certain exceptional instances, as for example, in connexion with the use of hospital tents.

In conclusion I have to express my indebtedness to the many members and officers both of hospital and sanitary authorities, who have, often as the result of a considerable expenditure of time and trouble, aided me in obtaining valuable information which without their help I could not have procured.



CIRCULAR LETTER addressed by the LOCAL GOVERNMENT BOARD to the  
several SANITARY AUTHORITIES in ENGLAND and WALES.

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Diseases, by  
Dr. Thorne.

Local Government Board, Whitehall, S.W.,  
27th March, 1879.

SIR,  
I AM directed by the Local Government Board to state that they are desirous of obtaining information as to the accommodation which exists throughout England and Wales for the isolation of cases of infectious disease, and I am to request that you will have the goodness to insert on the enclosed Form particulars of any such accommodation (other than in connexion with the workhouse) which is available for cases arising in the sanitary district.

I am also to request that the Sanitary Authority will call upon their Medical Officer of Health for a short report on the working of the arrangements for the isolation of patients, and upon the influence which, in his opinion, it has exercised upon the spread of infectious disease; and that a copy of such report may be transmitted to the Board.

If no such provision has been made, the Form should be returned to the Board with a note to that effect.

I am Sir,  
Your obedient Servant,  
JOHN LAMBERT,  
Secretary.

The Clerk to the Sanitary Authority.

District.

HOSPITAL ACCOMMODATION FOR INFECTIOUS CASES.

1. Is any accommodation of the nature of an isolation hospital (other than in connexion with the workhouse) available for cases of infectious disease arising in the district?
2. If so, has such accommodation been provided—
  - (a) by the Sanitary Authority independently?
  - (b) by the Sanitary Authority in combination with the Authority of another district?
  - (c) by arrangement for the admission of patients into some hospital not under the control of the Authority? If so, what is the nature of the arrangement?
  - (d) in any, and what other way?
3. Since what date has such accommodation been available?
4. Is the accommodation of a permanent or of a temporary character?
5. How many beds are available for patients from the district, and is there separate accommodation for the two sexes?
6. Does the accommodation admit of patients having one infectious disease being kept apart from patients having another infectious disease?
7. How many patients suffering from—
  - (a) Scarletina
  - (b) Small-pox
  - (c) Enteric or typhoid fever
  - (d) Other infectious diseaseshave been treated at the hospital in each of the three years, 1876, 1877, 1878?

	1876.	1877.	1878.
Scarlatina - -			
Small-pox - -			
Enteric fever			
Other diseases			
Total -			

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

8. Is any, and what charge made to the patients for admission or in respect of maintenance, and what amount, if any, has been received from patients in the three years, 1876-7-8 ?
9. What was the original cost of the hospital to the Sanitary Authority for—  
(a) Site (*if leased, state rent and term*),  
(b) Buildings,  
(c) Fittings and furniture ?
10. What has been its cost to the Authority (including rent and interest on original outlay, but including all other current expenses), for each of the three years 1876-7-8 ?

Dated \_\_\_\_\_, 1879.  
Clerk to the Sanitary Authority.

Report by Medical Officer of Health on the working of the arrangement for the isolation of cases of infectious disease, and upon the influence which it has exercised upon the spread of infection.

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## II.—LOCAL HOSPITAL REPORTS.

### ABERDARE URBAN SANITARY DISTRICT.

Population in 1881, 33,796. Rateable value, 130,683*l*.

APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Small-pox  
leading to  
hospital pro-  
vision.

Site and soil.

Hospital  
buildings.

Ambulances,  
&c.

Water supply  
and drainage.

The hospital for infectious diseases in the Aberdare urban district was erected in 1874, owing to a prevalence of small-pox. It was, however, only completed when the epidemic was practically at an end, and no patients were admitted into it. It occupies a completely isolated position close to the Aberdare public park, and near the centre of the urban district which covers some 16 square miles. The more populous portions of the district lie within from a quarter of a mile to two miles of it, and the town of Aberdare itself is less than a mile distant. The site is an elevated one covering nearly one acre; the grounds are neatly laid out, and they are enclosed by a stone wall 8 feet in height. The soil is clay.

The hospital buildings consist of the hospital proper and of two groups of outbuildings, all standing on a bed of concrete 8 inches in thickness. The hospital proper consists of four ward-pavilions connected together as one building by means of the administrative apartments which occupy a central position, and from which the pavilions project at right angles; the whole somewhat resembling in shape a Grecian cross. In two of the four angles thus formed is a semi-detached nurse's sleeping room, a ward-closet, and an earth-closet. Apart from the kitchen, which is in the centre of the administrative apartments, and which is of brick, all these buildings are of corrugated iron lined with varnished pine, and they stand on stone foundations. The walls and roof are 6 inches thick.

Each ward-pavilion contains one ward, having at the end nearest the administrative apartments a nurse's room and a scullery, and at the outer end a bath-room containing a fixed bath and two earth-closets. The latter offices open into a lobby which, instead of having means of cross-ventilation, is provided with one window only facing the ward door. The wards themselves are 40 feet long and 24 feet wide. In height they are  $12\frac{1}{4}$  feet to the wall plate and  $16\frac{3}{4}$  feet to the collar of the roof. They thus each contain 960 square feet, and 14,775 cubic feet; and they are each adapted to the reception of some seven patients, or 28 in all. The building is, however, imperfectly arranged for the simultaneous isolation of cases of more than one infectious disease. There are four double-hung sash windows in each external side wall and two in the outer end wall of each pavilion. The side windows are 6 feet above the floor level, thus giving a somewhat gloomy look to the wards; those at the outer end wall are high up, and are intended mainly for the purposes of ventilation. Two stoves are fitted in the central line of each ward, ventilating shafts fitted with revolving cowls being placed by the side of the chimney shafts.

Both groups of outbuildings are substantial stone structures; one contains a laundry and a room originally intended as a "fumigating chamber," but now used as an ironing room; the other contains a mortuary and an ambulance shed. In the latter is an ambulance fitted with a canvas top and sides, and capable of receiving a patient in a recumbent position.

A constant service of water is laid on from the town mains, and the drainage is into the public sewers, there being no direct connexion between the sewers and the interior of the buildings.

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Admission of  
patients.

Between the opening of the hospital in 1874, and the date of my visit in 1881, only four patients, all suffering from enteric fever, had been admitted, although the need for measures of isolation against the spread of infection have been most urgent, as will be seen from the following mortality statistics.

Deaths registered in the Urban District of Aberdare.

Date.	Small-pox.	ScarletFever.	"Fever."	Diphtheria.
1874 ... ..	24	91	56	2
1875 ... ..	—	62	43	1
1876 ... ..	—	8	15	11
1877 ... ..	—	9	21	5
1878 ... ..	—	—	14	5
1879 ... ..	—	—	12	2
1880 ... ..	—	48	19	5
1874-80 ... ..	24	218	180	31

Failure to  
secure isolation  
considered.

The circumstances which have led to this failure to secure isolation are quite exceptional. The hospital buildings are by no means unattractive, and they lie within a reasonable distance of a large proportion of the population, which is, to a very great extent, made up of miners and iron-workers, who have no proper means for the isolation of cases of infectious diseases in their own homes. The establishment is kept in good repair, its administration is in the hands of Dr. J. D. Hutcheson, who is also appointed, hitherto at a salary of 20*l.* per annum, to attend any patients who do not call in another practitioner; and the resident care-taker and his wife, who have received 84*l.* a year, are stated to be most suitable persons for their post. The sanitary authority are also willing to bear all the expenses incurred during the isolation of patients, and they have taken no steps as regards the few cases admitted to recover any portion of those expenses. Visitors have also been allowed, under suitable restrictions, to visit patients.

Whilst, however, notices have, as for example, during epidemics of scarlet-fever, been freely distributed amongst the population indicating various methods by which the risk of the spread of infection might be diminished in the case of patients treated in their own homes, I cannot learn that the people have in any similar way been warned against the almost invariable worthlessness of any such attempts in a district circumstanced as Aberdare is, or that the importance of securing the isolation of the first patients attacked, instead of waiting until disease has somewhat widely spread, has been pressed upon them. It is true that when scarlet fever had become prevalent early in 1881 notices were issued reminding medical practitioners of the powers possessed by the sanitary authority under section 124 of the Public Health Act, 1875, on receipt of a certificate from a medical practitioner, but I cannot gather that the sanitary authority have through their own officers taken any initiative in giving effect to these powers. On one occasion, some three years ago, an enteric fever patient was removed from an unwholesome dwelling to

Public Health  
Act, 1875, sec.  
124.



the hospital under an order of a magistrate, a large crowd collecting around the ambulance but not interfering with the removal; since then, however, no further action has been attempted in this direction. It is also a strict rule that no mother or other relative can be allowed to accompany a sick child into the hospital, and this may act as a deterrent to its use. In the case of the patient whose compulsory removal has been referred to the mother did, apparently without the sanction of the authority, remain the first night with her child, the result being, as has been the case under the same circumstances elsewhere, that she quitted the building the next morning quite contented to leave the patient behind. Whilst, however, these latter circumstances must be considered in connexion with the remarkable failure to secure the isolation in hospital of patients suffering from infectious diseases in this district, I was assured by the chairman of the sanitary authority and by others, that the principal ground of failure lay in the strong aversion exhibited by the labouring population of the district to quit their homes when ill, an aversion which was by no means limited to hospitals for infectious diseases, but which applied equally, or nearly so, to general hospitals and other hospitals established for special purposes.

APP. NO. 1.  
On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

The cost of constructing the hospital amounted to upwards of 3,000*l.*, the site being the property of the urban authority. The maintenance expenses, including the two salaries above referred to, have during the last two years been as follows:—For the year ending March 1879 they amounted to 174*l.* 12*s.* 8*d.*, including a sum of 38*l.* 18*s.* 8*d.* for repairs and other structural works; for the year ending March 1880, the total cost was 174*l.* 11*s.* 8*d.*, inclusive of 21*l.* 2*s.* for structural works. On the other hand, the guardians of the Aberdare Union pay to the sanitary authority an annual sum of 220*l.* for the right to send in any pauper cases of infectious diseases, and they also undertake to pay an additional sum of 1*s.* 4*d.* per day for each patient under isolation. This arrangement has been in operation since September 1877. One case of enteric fever had been sent in under it.

Cost of construction and maintenance.

#### ALCESTER RURAL SANITARY DISTRICT.

Population (estimated), 18,170. Rateable value, 98,372*l.*

The town of Alcester having been visited with a severe epidemic of small-pox early in 1875, the existing hospital, now known as "The Sanatorium," was hurriedly erected by the Rural Sanitary Authority, with a view of preventing the further spread of the disease. Out of a total of 76 cases which occurred, 41 were admitted into it, and the epidemic then ceased.

Small-pox leading to hospital provision.

The hospital occupies an isolated position to the north of Alcester, and it is situated in a fairly central position as regards the rural district, the furthest points of which are from four to seven miles distant from it. The site is a piece of land of about two acres in extent, enclosed partly by hedges and partly by a fence. It is granted free of rent by the Marquis of Hertford, and it lies about 150 yards to the south-west of the Alcester Workhouse, although on the opposite side of the road. The soil is gravel.

Site and soil.

The hospital buildings consist of two ward-pavilions, a wash-house, an ambulance shed, containing an old brougham stripped of its linings and painted inside, and a mortuary. The principal ward-pavilion is a wooden building standing on brick piers. Outside, the walls are weather-boarded; inside, they are of varnished pine, the interspace of 5 inches being filled with sawdust. In the centre of the pavilion are certain

Hospital buildings.

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Drainage and  
water-supply.

Admission of  
patients.

administrative rooms together with an entrance lobby, and on either side of these is a ward having windows in the opposite side walls. These windows vary in construction and some do not open properly. There is also a ventilator in the outer end wall. The roof consists of single planks covered with felt and slates. An imperfectly ventilated earth-closet opens directly out of either ward. Each ward has a capacity of 460 square feet, and 6,900 cubic feet, and at the time of my visit contained eight beds. Though children constitute the principal patients, yet the wards must be deemed overcrowded. Both wards are warmed by open fire-places, but owing to the construction of the building it is found difficult in severe weather to maintain in them either a sufficient or an equable temperature. In the winter of 1880-81 the temperature fell as low as 38° Fahr. The second hut-pavilion consists of one room only; it is now used as a play-room, and being unfit for the reception of patients it needs no description.

The slop water from the wards, baths, &c., passes into a "dumb-well." The water-supply is from a well sunk into a gravelly soil in a neighbouring field, a pipe passing from it to the hospital buildings where the pump is situated.

During the three years 1878-80 the admissions to the hospital, together with the deaths registered in the rural district from the causes specified were as under:—

Date.	Small-pox.		Scarlet Fever.		Diphtheria.		"Fever."	
	Deaths regis-tered.	Admissions to Hospital.	Deaths regis-tered.	Admissions to Hospital.	Deaths regis-tered.	Admissions to Hospital.	Deaths regis-tered.	Admissions to Hospital.
1878 ... ..	—	—	32	108	20	5	5	—
1879 ... ..	—	—	9	35	5	—	14	—
1880 ... ..	—	—	14	85	2	—	7	—
1878-80 ...	—	—	55	228	27	5	26	—

The hospital being only adapted to the reception of cases of one disease in both sexes, its use has, since the small-pox epidemic of 1875, been practically limited to the isolation of cases of scarlet fever, and I am informed that, notwithstanding the somewhat unattractive exterior of the building, but little difficulty has occurred in securing the removal of patients to it. Patients have also been received from all parts of the rural district, and this although some of the villages included in it lie as far as seven miles away. Most of the populous localities, however, are only from one to four miles distant.

The results of the isolation carried out have also been satisfactory in the extreme, numerous instances having been reported to me in which the early removal of a case of scarlet fever from a house containing other children, not protected by former attacks, prevented any further spread of the disease. On three different occasions pupils suffering from scarlet fever were removed from two boarding schools, and no spread resulted, whereas an attempt to isolate a case in a similar establishment led to seven other attacks.

Results of  
isolation.



The removal of patients to the hospital is always followed by the stripping of wall-paper and lime-washing in the affected apartments, and also by the fumigation or destruction of clothing, bedding, &c., these measures being carried out at the cost of the Sanitary Authority.

A considerable number of young children have been isolated in the hospital. Thus out of 220 of the 233 patients admitted in the three years 1878-80, and concerning whom accurate details were procurable, 179 or 81 per cent. were children varying in age from a few months to 10 years; the actual ages being as under:—

APP. NO. I.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Removal to  
hospital  
followed by  
measures of  
cleansing, &c.  
Admission of  
young children.

Under one year	-	-	-	-	-	-	-	1
One year -	-	-	-	-	-	-	-	4
Two years	-	-	-	-	-	-	-	15
Three years	-	-	-	-	-	-	-	25
Four years	-	-	-	-	-	-	-	22
Five years	-	-	-	-	-	-	-	24
Six years	-	-	-	-	-	-	-	14
Seven years	-	-	-	-	-	-	-	26
Eight years	-	-	-	-	-	-	-	21
Nine years	-	-	-	-	-	-	-	17
Ten years	-	-	-	-	-	-	-	10
								<hr/> 179
Above ten years	-	-	-	-	-	-	-	41
								<hr/> 220
Total	-	-	-	-	-	-	-	<hr/> 220

Mothers are allowed to accompany their children to the hospital, a seat being provided for them by the side of the ambulance driver, and they are permitted to remain and see the patients comfortably placed in bed. The mothers of very young children are also at times allowed to remain either for a few days, or during the whole time of their children's detention, provided they consent to subject themselves to the nurse's directions. On leaving they take a bath, and their clothing, as also that of all patients, is submitted to the fumes of burning sulphur.

The social status of the patients is very varied, a not insignificant number being removed from houses where the ordinary means of isolation to be obtained in private houses could easily have been afforded. Of the 220 patients above referred to, the calling and occupation which either they or their parents followed, was as under:—

Social status.

Needle makers, &c.	-	-	-	-	-	-	-	62
Labourers	-	-	-	-	-	-	-	51
Domestic servants	-	-	-	-	-	-	-	23
Tradespeople	-	-	-	-	-	-	-	19
Timekeepers	-	-	-	-	-	-	-	9
Laundresses	-	-	-	-	-	-	-	2
Policemen	-	-	-	-	-	-	-	2
Farmers, professional men, &c.	-	-	-	-	-	-	-	5
Paupers	-	-	-	-	-	-	-	47
								<hr/> 220

None of the pauper patients who have been admitted were received in pauper dress, and it is not believed that other patients have recognised them as paupers.

Admission of  
paupers.

## APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Repayments by patients, Public Health Act, 1875, s. 132.

General and medical administration.

A charge varying from 2s. 6d. to 10s. a week, according to the means of the patient's family, is made by the Sanitary Authority, but it is well known that it will be remitted either in whole or in part in the case of the poor, and the fact of a charge being made is hence not believed to have hindered the admission of a single patient. On one occasion, however, it was found necessary to take legal proceedings with a view to the recovery of the amount due.

The general administration of the hospital is vested in the hands of Mr. G. H. Fosbroke, Medical Officer of Health, but it is to a great extent delegated to the Inspector of Nuisances, who performs the duty with considerable efficiency. For this service he receives an annual sum of 5*l*. The only permanent resident is a nurse who receives 25*l*. a year, together with fuel, lights, and board. When the hospital is empty board wages are substituted for the board. The patients are, as a rule, attended by Mr. J. Martin or Mr. T. Smith, surgeons, of Alcester, either at their own cost or at the cost of the Sanitary Authority, according to their means. The poor law medical officer for the Alcester poor law district, however, attends paupers admitted from that district, and the services of any other qualified medical practitioner can be called in at a patient's own cost.

Visitors.

Visitors are, according to the rules laid down, only admitted to see "patients dangerously ill," notice of such illness being invariably forwarded to the nearest known relatives or intimate friends of the patients. On the occasion of such visits the visitors are required to replace part of their dress by a mackintosh cloak, and they are obliged to wash and as far as possible cleanse the exposed parts of the body before leaving. Twice a week, however, parents or relatives are allowed, at a stated hour and for a brief period, to see the patients in whom they are interested through the ward windows. The rules relating to visitors are appended. (Appendix A.)

Success in securing isolation.

Having regard to the imperfect character of this hospital, the construction of which was completed in 15 days, the success attending its use for scarlet fever has been somewhat exceptional; the total number of patients admitted being more than four times as numerous as the deaths registered from that disease. Indeed, I am informed by Mr. Fosbroke that to the best of his belief no cases have been treated at home, except such as have occurred in houses where fair means of isolation were available, this result being obtained without any resort to proceedings under section 124 of the Public Health Act, 1875.

Public Health Act, 1875, s. 124.

Causes leading to isolation of scarlet fever.

Mr. Fosbroke attributes this success to several causes. In the first place, the population of the district is a poor one, and it has not been found difficult to convince parents and others that the means of isolation at their disposal in their own homes were quite inadequate to prevent the spread of infection. Then again, the hospital has acquired a considerable reputation for comfort and excellence of nursing; and the mortality in it has also been extremely small. But more than all, the voluntary system of notification of infectious diseases which is in operation is believed to have conduced to this end. Since the beginning of 1877 the Rural Sanitary Authority have paid a fee of 2s. 6d. to every qualified medical practitioner for each case of infectious disease reported by him, and every medical man in the district not only forwards the information to the Inspector of Nuisances as required, but he forwards it promptly, adding at the same time whether removal to the hospital is in his opinion necessary. (See Form, Appendix B.) If he deems removal unnecessary, the house in question is merely visited for the purposes of disinfection, cleansing, and the removal of conditions injurious to health. But in any case a report on a special form (see

Voluntary notification of infectious diseases.



Appendix C.) is at once forwarded by the Inspector of Nuisances to Mr. Fosbroke, who visits the house or not according to circumstances. Such a visit, in company with the medical man in attendance, together with a careful examination of the premises, is, however, invariable in the case of enteric fever, when the sanitary circumstances are, presumably, imperfect.

APP. No. 1.  
On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

The cost of erecting the wooden buildings forming the hospital was 453*l.* 1*s.* 8*d.*; the furniture and fittings cost an additional 124*l.* 11*s.* 9*d.*, and the fly, which serves as ambulance, 9*l.* 10*s.*, making a total of 587*l.* 3*s.* 5*d.*

Cost of construction, &c.

The cost of maintenance, including the nurse's salary, medical attendance, &c., was 573*l.* 10*s.* and 384*l.* 15*s.* 5*d.* for the two years ending respectively September 1879 and 1880, the principal items being as under:—

Cost of maintenance.

	1 year ending Sept. 30, 1879.	1 year ending Sept. 30, 1880.
	£ s. d.	£ s. d.
Provisions and other necessaries for patients ... ..	366 0 0	207 14 11
Medical attendance and medicines ... ..	117 10 0	80 5 6
General management, repairs, &c. ... ..	60 0 0	66 15 0
Nurse ... ..	25 0 0	25 0 0
Inspector of Nuisances ... ..	5 0 0	5 0 0
	573 10 0	384 15 5

From each of these amounts must, however, be deducted a sum which during the past three years has averaged 22*l.* 9*s.*, and which has been repaid by patients or their friends.

This hospital is not known ever to have led either directly or indirectly to any spread of infection. The ambulance is always driven by a trustworthy person, who has distinct instructions to stay nowhere on his way; and the nurse is required to change her clothing in a detached building before leaving the premises; the change made being a fairly complete one, not one limited to outer garments only.

Influence of hospital on surrounding neighbourhood, &c.

# APPENDIX A.

## RULES REGULATING THE VISITING OF PATIENTS.

I.—The visiting of patients in this hospital is limited to the nearest relatives and intimate friends of patients *dangerously ill*. One visitor will be allowed daily to each of such patients. Such visits can only be made with the permission of the Superintendent, and will be limited in duration to a quarter of an hour—except in very urgent cases, when two visitors will be allowed and the duration of the visits may be extended.

II.—Notice will be sent to the nearest known relatives or intimate friends of patients *dangerously ill*, with an intimation that they may be visited. Such notice will be accompanied by a copy of the regulations under which visits can be made.

III.—Parents will be allowed to see their children through the windows on Tuesday and Friday afternoons, from 3 to 4, but it is requested that their visits be as brief as possible.

IV.—Visitors are warned that they run great risk in entering the hospital.

## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

## V.—Visitors are advised—

- (a.) Not to enter any of the wards when in a weak state of health, or in an exhausted condition ;
- (b.) To partake of food before entering the hospital ;
- (c.) To avoid touching the patient, or exposing themselves to the breath or to the emanations from the skin ;
- (d.) To sit on a chair at the bedside, at some little distance from the patient, and not to handle the bedclothes.

VI.—Visitors will be required to wear a wrapper (which will be provided at the hospital) to cover their dress when in the wards, and to wash their hands and face with carbolic soap and water before leaving the hospital, or to use some other mode of disinfection, at the discretion of the Superintendent.

VII.—Visitors are strongly urged not to enter any railway carriage or other public conveyance immediately after leaving the hospital.

## APPENDIX B.

*Immediate.*

No. .

NOTICE of the EXISTENCE of SMALL-POX, TYPHUS, TYPHOID, and SCARLET FEVERS, and DIPHTHERIA.

Mr. CHARLES GANDER, Sanitary Inspector for the Alcester Rural Sanitary Authority.

I HEREBY certify that , residing at , in the parish of , within the Alcester Rural Sanitary District, is suffering from and that isolation of the patient is\* possible in the dwelling in which he resides, and I consider h removal to the Sanatorium\* necessary.

*Medical Attendant.*

Dated

187 .

\* Insert the syllable "im" or "un" if necessary.

## APPENDIX C.

No. .

NOTICE of INFECTIOUS DISEASE by SANITARY INSPECTOR, as per Order of LOCAL GOVERNMENT BOARD.

To Mr. G. H. FOSBROKE, Medical Officer of Health.

I HAVE to inform you that at the house occupied by , situated at , in the parish of in the district of the ALCESTER RURAL SANITARY AUTHORITY, there is, to the best of my belief and knowledge, a case of

Dated this day of 188 .

Signed,

*Sanitary Inspector,  
Alcester.*

For particulars of case, see other side.



(BACK OF FORM.)

APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Name of patient \_\_\_\_\_

Age \_\_\_\_\_

Date of commencement of illness \_\_\_\_\_

Appearance of rash (if any) \_\_\_\_\_

What infectious disease exists in neighbourhood \_\_\_\_\_

Probable number of infected houses \_\_\_\_\_

Has the patient been from home ; if so, where to ? \_\_\_\_\_

Have visitors frequented the house ? \_\_\_\_\_

If so, from whence do they come ? \_\_\_\_\_

Has there lately been illness in the family ? \_\_\_\_\_ if so, name such \_\_\_\_\_

Is washing, &amp;c. taken in ? \_\_\_\_\_

What are the ages of the occupants of the house ? \_\_\_\_\_

Who is the medical attendant ? \_\_\_\_\_

Has the patient been exposed to infection ? \_\_\_\_\_

What precautions are being taken ? \_\_\_\_\_

Is isolation practicable ? \_\_\_\_\_

How is the disease likely to be disseminated ? \_\_\_\_\_

What insanitary conditions are associated with the case ? \_\_\_\_\_

If the case be small-pox, at what age was vaccination performed ? \_\_\_\_\_

" " revaccination " \_\_\_\_\_

## AMERSHAM RURAL SANITARY DISTRICT.

Population in 1871, 16,987.

In May, 1871, typhus fever was imported into the town of Chesham, in the Amersham rural sanitary district; it soon became epidemic, and before the termination of the outbreak, in November, there had been over 80 attacks and 24 deaths. During the course of the outbreak Chesham was visited by one of the Board's inspectors, and under his advice, means of isolation, hitherto absent, were provided. A cottage hospital, maintained by private funds, for the reception of ordinary medical and surgical cases, was, in view of the emergency, prepared for the reception of the sick; and the committee of that hospital also erected a temporary iron hospital on their grounds. The latter hospital was in October 1871 handed over to the Chesham Vestry, acting as the Sewer Authority, on the condition that they would pay all expenses pertaining to its maintenance during the continuance of the epidemic. This offer was accepted. Both hospitals were at once brought into use for the reception of typhus patients, and the epidemic soon ceased.

The iron hospital erected at that date is the one now belonging to the Amersham Rural Sanitary Authority, it having been taken over by them from the Cottage Hospital Committee in June 1873, at a nominal rent of 5s. per annum, subject to a three months' notice. It occupies an

Site and  
construction

isolated position on the slope of a hill just outside Chesham, and besides the cottage hospital which stands some 50 yards away, no building is near it. The hospital is of corrugated iron, and stands on brick piers. It is lined throughout with stained match-boards. It was originally a small iron church, and the windows with which it is provided were evidently not constructed with a view to efficient ventilation. Louvred openings have, however, been added in the roof.

The main building consists of two wards having separate entrances, together with an ill-lighted and ill-ventilated nurse's sitting and bedroom in the centre. One ward has a superficial area of 730 square feet, and some 15,000 cubic feet. The other is of irregular shape; it has about 520 square feet of floor space, and somewhat under 11,000 cubic feet. The ceilings rise with the roof, and the two wards communicate with each other above the level of the wall-plate. A kitchen opens out of the nurse's room, and earth-closets, having no means of ventilation into the outer air, open directly into the building. Water is laid on from a deep well belonging to the cottage hospital. The drainage is into a cesspool. A small detached shed serves as a laundry; a wooden shed has been erected for fumigation purposes; there is a separate dead-house, and an old cab is used as an ambulance.

Since the cessation of the typhus epidemic, in 1871, this hospital has only been used at rare intervals for isolated cases, such as domestic servants, sent in and paid for by their masters. In 1879, an epidemic of scarlet fever, resulting in 24 deaths, occurred in Chesham, and although six beds are kept in readiness at the hospital, no cases were admitted. At the date of my visit, in July 1880, the same disease was again epidemic in Chesham. Some 50 cases had already taken place, and the disease was found to be prevailing under conditions of overcrowding, which would necessarily tend to its further spread. The hospital had, however, in no case been used for the purposes of isolation. On inquiring as to the reason of this, I found that it was due to two causes: In the first place the building had, owing to its imperfect construction, been reported by the Medical Officer of Health as unfit for use during the cold weather, and hence it had been looked upon as useless. The second, and probably more important, cause had reference to the limited area for which the hospital is available. When the Chesham Cottage Hospital Committee sanctioned its erection in their grounds, in 1871, it was on the condition that it should only be used for cases of infectious diseases occurring in the parishes of Chesham, Chesham Bois, and Chenies. Since its transfer to the guardians, as a Rural Sanitary Authority, the expense of its maintenance is necessarily borne by the whole rural district; whereas, it is still deemed available for three parishes only. Hence difficulties have occurred, not only as to its use, but as to its being put into a condition of proper repair.

[Shortly after my visit, such repairs as were deemed necessary to fit the building for the reception of patients during the warm weather were effected, and between 30 and 40 patients were at intervals admitted.]

#### ASHFORD URBAN SANITARY DISTRICT.

Population in 1881, 9,693. Rateable value in 1879, 43,637*l*.

Some 15 years ago Mr. H. Whitfeld, M.R.C.S., a medical practitioner in Ashford, being impressed with the desirability of procuring isolation in cases of infectious diseases, built a small villa-cottage within the urban district, and fitted it up as a hospital for the reception of such cases. It was purely a private establishment, and it was mainly used in



connexion with his own practice. Since Mr. Whitfeld's death the Urban Sanitary Authority have leased the premises for 21 years at an annual rental of 20*l.*, and they have also enlarged the building.

As they now exist the premises consist of a two-storied dwelling, partly of stone, partly of lath-and-plaster, with weather tiles outside, standing in a small plot of garden ground, about one mile from Ashford town, and approached by a lane branching off from a main road. On the ground floor are a kitchen, a sitting-room, and a bedroom for the care-taker and his wife; also a store for coal, wood, &c. On the upper floor are four somewhat irregularly-shaped rooms, intended for the use of patients, and a watercloset, which is ill-ventilated, and opens directly into the interior of the building. Three of the rooms are bedrooms varying from about 1,220 to 1,450 cubic feet in capacity, and one is a sitting-room containing somewhat over 1,200 cubic feet. One of the larger bedrooms contains two beds, the others are fitted for one patient only. The rooms are neatly and comfortably furnished; they have casement windows, and some have additional means of ventilation through the roof. They are all provided with open fireplaces. Water is procured from a well on the premises. The drainage is into a cesspool which is situated at a lower level than the well; it is stated to be provided with an opening for the purposes of ventilation, and there is a trap between it and the house. There is, however, no proper ventilation of the house drain.

There is no mortuary, and no provision is made for disinfection. The burning and fumigating of clothing, &c. is, however, at times resorted to.

This hospital came into the possession of the Sanitary Authority in 1877, and the number of patients admitted since then have been as follows :

Admission of  
patients.

Date.	Small-pox.	Scarlet Fever.	Enteric Fever.	Other Diseases.
Part of 1877 ...	1	—	2	—
1878 ...	—	—	2	—
1879 ...	—	4	—	2

Nearly all the above patients have been members of tradesmen's families, or servants sent in by their masters; the establishment being hardly at all used by mechanics and the other labouring classes who make up so large a proportion of the population of Ashford, and in whose houses it is admittedly impossible to secure reasonable means of isolation for cases of infectious diseases. The reason of this is obviously due to the circumstance that under existing conditions the expense devolving upon the patient or his friends acts as a deterrent to this class. All patients are required to pay to the Sanitary Authority 12*s.* a week for their accommodation and nursing, to repay to them the cost of their board and maintenance, and themselves to provide medical attendance. It is true that in certain instances the Sanitary Authority have remitted part of the payment, and that they have never taken proceedings under section 132 of the Public Health Act, 1875, to enforce payment, but the knowledge that payment of the full sum will be demanded is known to have prevented the use of the hospital by the classes referred to. Between the date when the Sanitary Authority became possessed of the hospital and the beginning of 1880 there had been but little infectious disease in the urban district; but in the three months,

Repayments to  
Sanitary  
Authority.

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May to July of the latter year, scarlet fever became prevalent and caused four deaths, the incidence of the disease being mainly upon the wage-earning classes, who, when requested to send their children to the hospital, declined on the ground of their inability to pay the cost which would be involved. Owing to the want of isolation the disease spread, the diffusion of the poison being to a great extent through the agency of the elementary schools. The circumstances here narrated had recently been brought under the notice of the Sanitary Authority by their officers, and I was informed that they were about to consider how far they could alter the conditions of admission into the hospital so as to meet the requirements of the poorer classes of the non-pauper population.

Advantages  
resulting from  
isolation.

It is, however, satisfactory to note that the few cases admitted have been nearly all, if not all, first attacks. On their removal from their homes, fumigation of the infected premises by means of burning sulphur and other precautionary measures have almost invariably been carried out under the supervision of the Medical Officer of Health, and I am informed that in no instance has a second attack occurred in the same house.

Ambulance.

A fly stripped of its linings answers the purpose of an ambulance. It is kept in the town, on premises belonging to the Authority, and it is "fumigated" and cleansed each time it is used.

In no instance has it ever been alleged that the hospital has by reason of the ambulance or otherwise been a means of communicating infection.

Cost of main-  
tenance, &c.

The annual expenses incurred in maintaining the hospital include a sum of 31*l.* to the care-keeper and his wife, the latter of whom was formerly a hospital nurse. This, together with the rent, fuel, rates, taxes, and sundries, has hitherto reached a total of about 60*l.* a year, but of this sum some 10*l.* have been repaid to the Authority by patients or their friends.

## BATH URBAN SANITARY DISTRICT.

Population in 1881, 51,790. Rateable value (1880), 268,276*l.*

Site and soil.

In 1876 the Bath Urban Sanitary Authority purchased a two-storied stone villa-residence standing in about six acres of land and occupying an isolated position at Claverton, about two miles out of Bath, for the purposes of a hospital for infectious diseases. Later on an additional piece of land, making in all some seven acres, was purchased, part being sub-let as an orchard and as grazing land. The premises, which are but imperfectly enclosed, occupy an elevated position on the Bath oolite and command an extensive and beautiful view of the surrounding country. The house itself stands at a little distance from two high roads which bound the grounds on two sides, and there is no other dwelling-house within a considerable distance.

Original  
hospital build-  
ings.

Some alterations were carried out in the house soon after the purchase was effected. It now contains (1) on the ground floor three rooms, used as sitting-rooms and surgery, two of which contain about 1,640 and the third some 1,400 cubic feet, together with a kitchen and a scullery; (2) on the first floor, five bedrooms or wards. All these latter rooms are of low pitch, measuring only 7 ft. 9 ins. in height, two have about 170 feet of floor space and 1,270 cubic feet; the third has 152 feet of floor space and 1,160 cubic feet, and a fourth nearly 320 feet of floor space and 2,420 cubic feet. They are all provided with double-hung sash windows, but one only has proper means of cross ventilation. On the first floor is



an earth-closet opening directly into the building. Outside the premises is a second one. APP. NO. 1.

Before the completion of the purchase of these premises they were visited by one of the Board's medical inspectors, and as the result of this visit the attention of the Authority was drawn to the inadequacy of the means of isolation afforded by the house in question, for a district containing at that time some 55,000 inhabitants, and they were urged to supplement it by the erection of buildings which would, amongst other things, enable them to treat apart patients of both sexes suffering from at least two separate infectious diseases. The necessity for the adoption of these measures were deemed the more urgent on account of a proposal which was made by the Bath Rural Sanitary Authority to use the hospital for the purposes of their district.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne. Insufficiency of original accommodation.

In July 1879 small-pox was imported into Bath, a single patient being in the first instance attacked. A second attack took place in September, four more in October, others again in November. The infectious hospital not having been enlarged and being available for the reception of a few cases of one disease only, it was at first not thought desirable to admit cases of small-pox into it, lest by so doing other cases of infectious disease which might occur should be excluded, and this course of procedure was deemed the more necessary because the hospital had ever since 1876 been usefully employed in isolating cases of scarlet fever. Thus, apart from two cases admitted in October into the infectious wards of the Bath Workhouse, no isolation of small-pox patients was carried out until November 18th, when one patient was removed to the hospital at Claverton. The disease, however, had begun to spread with rapidity, and before the end of December some 80 cases had come under the notice of the Sanitary Authority. And not only so, but cases of measles were reported as having become "frequent and fatal," isolated attacks of scarlet fever were recorded, and small-pox appeared outside the city boundary in the Bath Rural Sanitary District. Under these circumstances Dr. Brabazon, the Medical Officer of Health for the city, urged the immediate provision of further means of isolation at Claverton, and early in 1880 a wooden pavilion was constructed. A second one was also erected in February. These two pavilions have since been connected by a passage provided with an entrance lobby and having means of cross-ventilation, and they contain five beds each, in addition to a nurse's room, kitchen, scullery, and closets.

Epidemic of small-pox.

Provision of further accommodation.

The epidemic, however, continued to increase both in the urban and rural district of Bath, and all available beds being occupied both at the workhouse, where some new wards had been temporarily used for the reception of small-pox patients, and in the Claverton Hospital, it was determined, on the advice of one of the Board's Inspectors, at once to erect two more detached wooden pavilions. These latter were, however, not completed until the epidemic had practically ceased. In all, nearly 320 cases of small-pox occurred, 178 being treated in the workhouse, 108 at the Claverton Hospital, and the remainder at their own homes.

The buildings now standing at Claverton are, 1<sup>o</sup>, the villa residence which is only adapted to receive four or five patients, and which, if a large number of patients were at any time under treatment in the hospital, would doubtless have to be reserved for the purposes of administration and nurses' bedrooms; 2<sup>o</sup>, the two wooden pavilions erected early in 1880, and which hold five beds each; and, 3<sup>o</sup>, two detached wooden pavilions erected later on, and each capable of receiving 16 beds. This gives a total of about 46 beds. Besides the above there is also a laundry, a "disinfecting chamber" where infected articles are exposed to chlorine fumes, a mortuary, an ambulance shed, and a detached cottage.

Existing hospital buildings.

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A detailed description of the pavilions will be unnecessary. Those last erected are built on solid masonry, and in almost every detail they resemble those recommended in the "Hospital Memorandum," issued by the Local Government Board. The pavilions erected in February 1880 are constructed on somewhat similar principles. The larger pavilions allow 150 feet of floor space, and 2,100 cubic feet per bed. The other two are, owing to the position of the nurse's room, somewhat irregular in shape; the floor space per bed is about 140 feet, and the cubic space about 1,550 cubic feet. In external appearance these wooden pavilions are much more attractive than is usually the case. The outside boarding is painted stone colour, with turkey red battens; the inside wall is varnished, and the interspace of 6 inches is filled in with sawdust.

The mortuary and ambulance shed almost immediately adjoin a high road, the latter opening on to it. The ambulance, which has been specially constructed for the purpose, has fixed seats, 4 feet 6 inches in length instead of one or more movable stretchers; the seats are of horse-hair covered with linen; loose waterproof covers being also provided for them.

The water-supply is from a well 70 feet deep, situated on the premises, and sunk into the inferior oolite, the supply being pumped into a tank constructed on the stone villa, from which all parts of the premises are supplied by gravitation. There are also two rain-water tanks, each holding 5,600 gallons, from which a supply can be pumped into the bath-rooms of the several pavilions. The drainage is by means of glazed pipes leading to a cesspool. The cesspool itself is ventilated, and at the head of every drain leading to it is a 3-inch ventilating shaft.

During the five years since the hospital was opened the following cases have been admitted :—

Water-supply  
and drainage.

Date.	Small-pox.	Scarlet Fever.	Diphtheria.
1876 ... ..	—	4	—
1877 ... ..	—	11	—
1878 ... ..	—	6	1
1879 ... ..	24	7	—
1880 ... ..	84	—	4
1876-80 ...	108	28	5

Cases of enteric fever are received into the Bath Royal United Hospital.

By far the majority of the above cases were admitted from the city of Bath, five cases only, namely, one of diphtheria in 1878, and four of small-pox in 1880, being admitted from the rural sanitary district. The population of the rural district is estimated about 21,000.

Towards the end of 1880 an arrangement was also entered into between the corporation of Bath and the guardians of the Bath Union for the reception into the Claverton Hospital of paupers suffering from infectious diseases.

In no instance has it been found necessary to take any proceedings under section 124 of the Public Health Act, 1875, for the compulsory removal of patients to the hospital.

A weekly charge, varying from 15s. to 21s., is generally made to such patients as can afford it, a guarantee for the amount being, as a

Arrangement  
with :—  
(a) the rural  
sanitary  
authority ;

(b) the Guar-  
dians of the  
Bath Union.

Public Health  
Act, 1875, s. 124.

Repayments  
by patients, &c.  
Public Health  
Act, 1875, s. 132.



rule, required before admission. It is, however, within the discretion of the Medical Officer of Health to admit patients free of charge when they are poor. Hitherto it has not been found necessary in any case to take legal proceedings for the recovery of the sums charged for maintenance, &c. The Rural Sanitary Authority pay 3*l.* 3*s.* for each patient they send in; the guardians make a weekly payment of 15*s.* per patient.

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On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

General and medical administration, &c.

The general administration of the hospital is under the supervision of Dr. Brabazon, who is assisted in this by the borough Inspector of Nuisances. Since 1877 one of the medical practitioners in the town has acted as medical officer, and he has had medical charge of the patients at a remuneration of 10*s.* for each visit to the hospital. When only a few patients are under treatment, or when the hospital is empty, the permanent resident staff consists of a man who has to attend to repairs and keep the grounds in order, and of two nurses. The former receives 18*s.* a week and also a cottage; the remuneration of each of the nurses being 11*s.* 6*d.* a week when the building is empty, and 16*s.* 6*d.*, together with board, when there are any patients.

Cost of buildings, &c.

The total cost of the Claverton Hospital was 6,000*l.* Of this, a sum of 843*l.* 8*s.* 7*d.* was paid for the villa building and the site; the first wooden pavilion erected, together with the mortuary and ambulance shed, cost 588*l.* 0*s.* 11*d.*; the last two pavilions erected cost, together with their water-supply, means of drainage, &c., 4,058*l.* 9*s.* 6*d.*; and the remainder was spent in alterations, furnishing, and incidentals.

Cost of maintenance, &c.

The current expenses, excluding a small ground rent and interest on capital, amounted during the year ending March 31st, 1880, to 456*l.* 10*s.*; this year including the greater part of the small-pox epidemic. The items were as follows:—

	£	s.	d.
Provisions - - - - -	118	9	10
Fuel, lights, &c. - - - - -	26	9	6
Wine and spirits - - - - -	22	7	6
Nurses' wages - - - - -	68	2	0
Carriage and horse-hire - - - - -	50	4	9
Medical attendance and drugs - - - - -	84	2	9
Insurance - - - - -	1	8	9
Sundries - - - - -	14	7	2
Disinfection - - - - -	70	17	9
	<hr/>		
	£456	10	0
	<hr/>		

The item for disinfection, however, includes the fumigation of infected houses in the borough, and hardly belongs to the hospital. A sum of 59*l.* 9*s.* 4*d.* was also refunded to the Urban Authority either by patients or by the Rural Sanitary Authority of Bath, and a further sum amounting to about 100*l.* was repaid during the next financial year on behalf of patients treated in the year under consideration.

BEDLINGTONSHIRE URBAN SANITARY DISTRICT.  
Population, 14,527.

COWPEN URBAN SANITARY DISTRICT.  
Population, 5,065.

SOUTH BLYTH URBAN SANITARY DISTRICT.  
Population in 1881, 1,982.

At Blyth a cottage hospital was provided by private effort in 1866 in consequence of "fever" having spread in the town from some person

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Hospital site  
and construc-  
tion.

who sickened there in a lodging-house. In 1871, however, owing to a prospect of cholera being imported from the Baltic, the Blyth Urban Authority, combined with the adjoining Urban Authorities of Cowpen and Bedlingtonshire, with whom they have a joint use of Blyth Harbour, took over the hospital cottage, added to it two others, and made certain alterations with a view of adapting them to the purposes of a hospital for infectious diseases. The hospital stands just outside the inhabited part of Blyth, and faces the sea; it contains three rooms, all on the ground-floor, for the reception of patients, besides a living and sleeping room for the care-taker and his wife, a kitchen and two water-closets. An enclosed corridor gives easy means of access to all parts of the building from the care-taker's rooms, and the kitchen. The care-taker follows his trade as bootmaker and uses the kitchen as his workroom; his wife is engaged to act as nurse when patients are admitted. There are six beds, and if the hospital were full of the cubic space per patient would only be some 800 to 900 feet. The ward-rooms have fair means of ventilation; a movable bath is provided; there is no direct communication between the interior of the building and the town sewer into which the building is drained; and the town water service is laid on.

Admission of  
patients.

This hospital can, however, hardly be regarded as affording the means of isolation for infectious diseases which is contemplated by the Public Health Act, 1875, for, although a few cases of cholera, small-pox, and other infectious fevers were admitted prior to 1871, when the building was transferred to the combined Sanitary Authorities, and although such cases are stated still to be received into it, provided payment for medical attendance and board is forthcoming, yet the hospital is now almost entirely used for general purposes. Thus out of 21 patients admitted in the seven years 1872-79, one was a case of enteric fever, one a case of erysipelas, and the remainder were ordinary medical and surgical cases. Three of the patients, all suffering from surgical injuries, were paid for by the guardians: the expenses of the remainder being borne by shipowners, foreign consuls, or by the patients themselves.

The conversion of the building into a cottage hospital for general purposes has, however, not been brought about by the absence of cases of infectious diseases needing to be isolated. Thus, in the Bedlingtonshire Urban District there have been in the four years 1875-78 44 deaths from scarlet fever, and 59 from enteric fever, and during the six months, May-October, 1879, scarlet fever was epidemic in that district, causing as many as 65 deaths.

## BERKHAMPSTEAD RURAL SANITARY DISTRICT.

Estimated population in 1879, 10,766. Rateable value, 70,907l.

Site and soil.

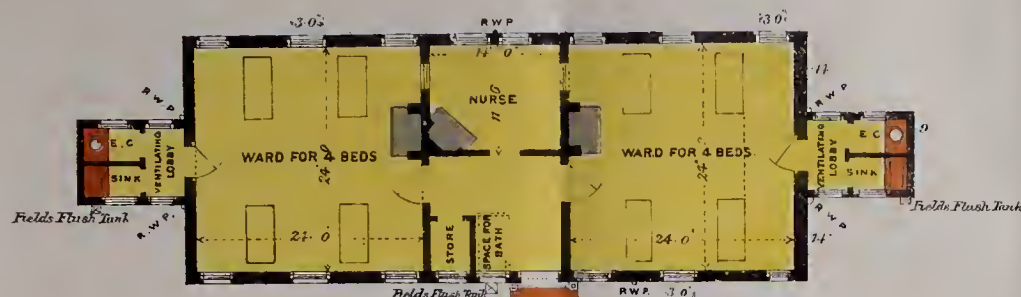
The hospital for infectious diseases belonging to the Berkhamstead Rural Sanitary Authority is situated in an isolated position in the parish of Aldbury, about  $2\frac{1}{2}$  miles from the town of Tring, the only urban district within the union of Berkhamstead. The site lies at the northern foot of a partly wooded and picturesque chalk range, and it consists of about 3 acres of land, having a frontage of 144 feet on to a highway, giving easy access to all parts of the rural district. To the front the grounds are enclosed by a substantial brick wall, ornamented with stonework. Elsewhere a hedge forms the boundary. The soil is clay, overlying the chalk, and, owing to a depression in the centre of the site, the hospital buildings have been placed on a slight elevation at the northern extremity of the land, and thus at the furthest point from the road.



# BERKHAMSTED RURAL SANITARY DISTRICT.

*Hospital for Infectious Diseases.*

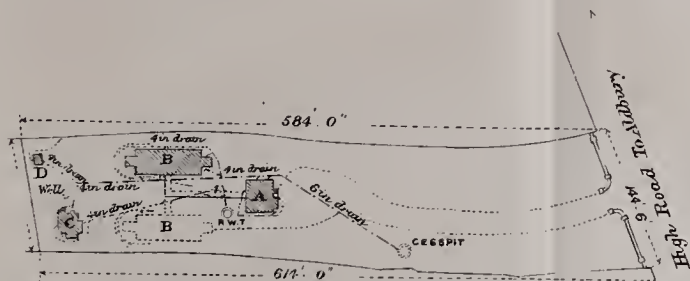
*1<sup>th</sup> / 16<sup>th</sup> in Scale*



GROUND PLAN OF HOSPITAL WARDS &c.



ADMINISTRATIVE BUILDINGS.  
GROUND PLAN.



A. Administrative Block.  
B. Ward Positions.  
C. Washhouse &c.  
D. Mortuary.

BLOCK PLAN.

*John Ladds Architect.*

*4. Chapel St. Bedford Row W.C.*

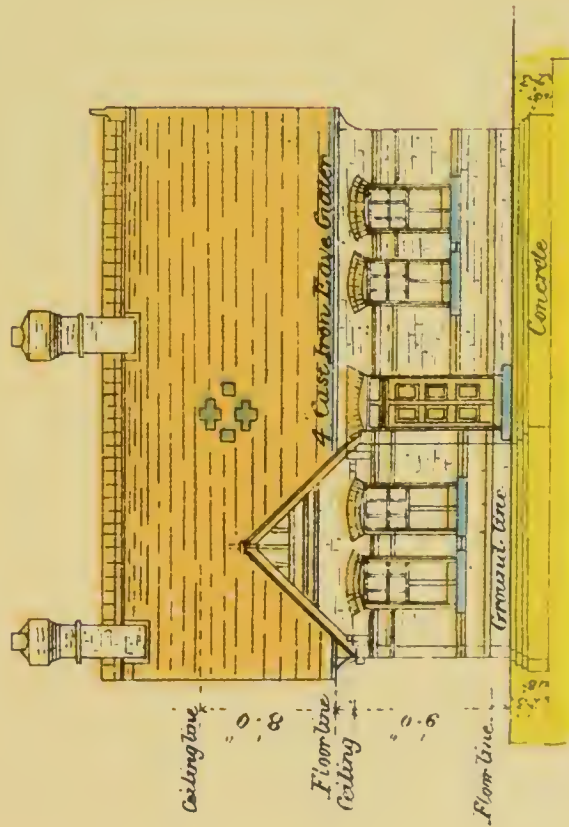




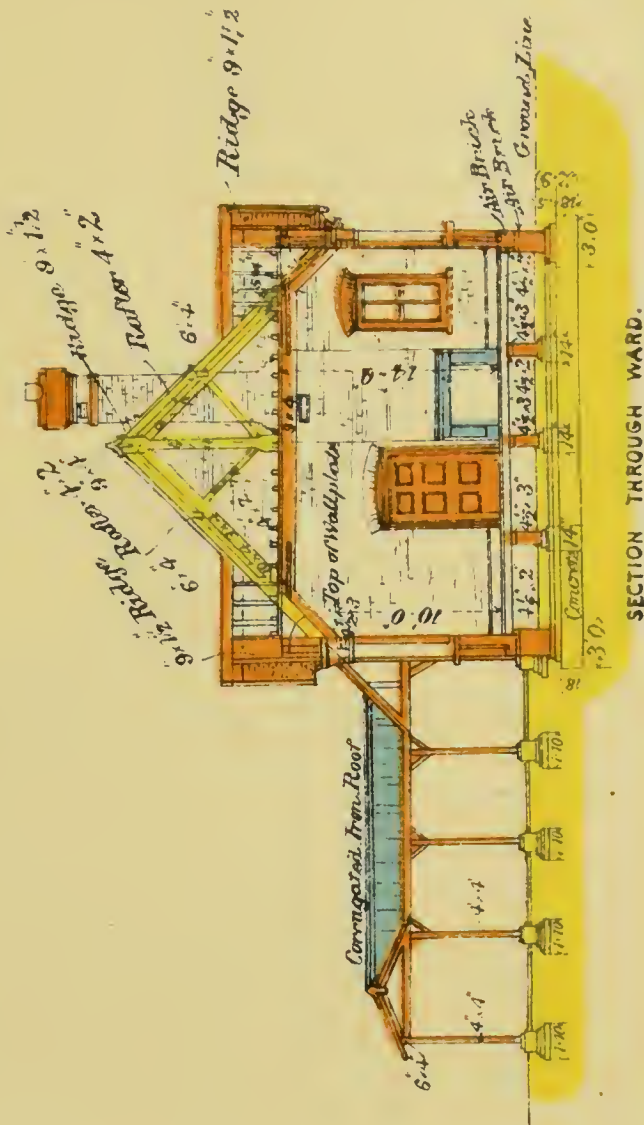
# BERKHAMSTED RURAL SANITARY DISTRICT.

## Hospital for Infectious Diseases

$\frac{1}{16}$ th in Scale.



FRONT ELEVATION OF ADMINISTRATIVE BUILDINGS.



SECTION THROUGH WARD.

John Ladd & Co. Architects.  
4 Chapel St. Bedford Row. W.C.

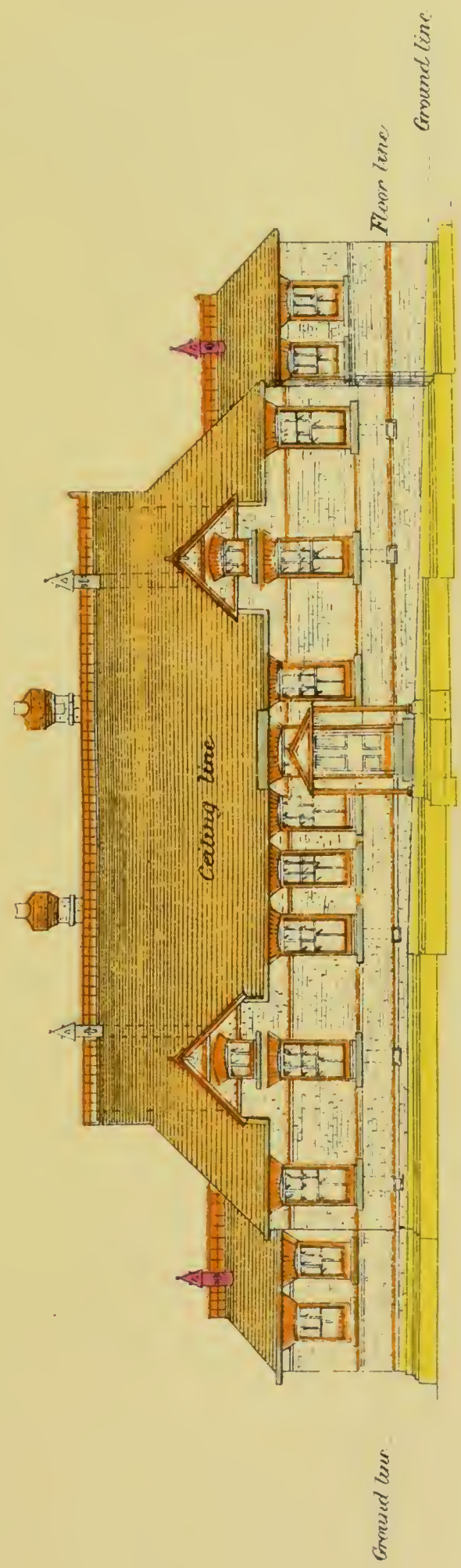




BERKHAMSTED RURAL SANITARY DISTRICT.

*Hospital for Infectious Diseases.*

*1/16" in. Scale.*



WEST ELEVATION AND SECTION THROUGH THE COVERED WAY.

*John Ladds, Architect.  
4, Chapel St. Bedford Row W.C.*





When the hospital was constructed the site was half a mile from the nearest dwelling-house in the village of Aldbury; since then, however, a large private residence has been erected some 300 yards off. The two points of the district which are most distant from the hospital are in the direction of the north-western and south-eastern boundaries, which are respectively  $4\frac{3}{4}$  and 7 miles away. So far, however, as the population is concerned, the buildings may be deemed to occupy a fairly central position.

APP. NO. I.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

The hospital buildings, as originally designed by Mr. John Ladds, of Chapel Street, Bedford Row, W.C., consist of two detached ward pavilions, communicating with an administrative block by means of a corrugated iron covered way, standing on wooden supports; and also of two detached buildings, one containing a wash-house, an ironing-room, an ambulance shed, a disinfecting room, and a store-room for dry earth; the other being a mortuary. At present, however, only one of the ward pavilions has been constructed. (See Plates, Nos. I., II., III.)

Hospital  
buildings.

The buildings which stand upon a bed of concrete have an attractive appearance; they are substantially constructed, and consist of white stock brick, with red brick strings, red-tile roofing, and enrichments of the same material. The existing ward pavilion contains two wards, which are separated in the middle of the building by a central passage leading from one ward to the other, and having on one side a nurse's room, on the other an entrance lobby, space for a movable bath, and a store-room. Each ward is 24 feet square and 10 feet high to the wall-plate from which the roof slopes to a level ceiling 14 feet in height from the floor. There are four beds in each ward, thus giving 144 feet of floor space, and 2,000 cubic feet per bed. The floors are well laid with well-seasoned tongued and grooved boards, and the woodwork throughout has every appearance of being of excellent quality. Each ward is provided with six double-hung sash windows, three in each opposite wall, and two small hinged window-frames, situated in a gable over each central window. The sash windows rise nearly to the wall-plate, one is placed nearly at the extreme end of each side wall, thus affording ample light in the corners of the ward, and, with a view of facilitating ventilation, the bottom rail of the lower sashes are double the usual depth, so that they can be raised to admit of air passing into the ward in an upward direction between the junction of the two sashes without causing any opening below. The amount of window surface to the cubic space in the wards is 1 square foot to about 130 cubic feet. There are also openings from the ceiling to the roof, fitted with Boyle's ventilators. In the construction of the wards, surfaces calculated to favour the deposit of dust have been studiously avoided. The walls are plastered and covered with a faint yellow-toned wash.

Capacity of  
wards.

Means of venti-  
lation and  
lighting.

At the extremity of each ward is a lobby provided with means of cross ventilation, and beyond are an earth-closet and a lavatory, ventilated in a similar manner and also provided with a ventilating shaft through the roof. The wards are fitted with Galton stoves with warm air shafts behind them. The nurses' room is fitted with windows commanding a view into each ward, and with a small cooking range and hot-water apparatus.

Earth-closet,  
lavatories, &c.

Means of  
warming.

The administrative block is a two-storied building. On the ground floor are a kitchen, scullery, sitting-room, surgery, pantry, store-room, earth-closet, and coal store. On the first floor are two bedrooms.

Administra-  
tive block.

The water is derived from a well sunk at the northern extremity of grounds to a depth of 49 feet into the chalk, the supply being raised by means of a force-pump into a tank from which a constant service can be provided to all parts of the premises by gravitation. The drainage is at

Water-supply  
and drainage.

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Ambulance.

Admission of  
patients.

Cost of con-  
struction and  
maintenance.

present into a cesspool situated 350 feet to the south of the well, the flow of the springs in the chalk being from north to south. All sink and waste-pipes open in the outer air over Field's flush tanks, from which 4-inch pipes lead to the cesspool.

A temporary ambulance is, for convenience sake, kept at the workhouse at Berkhamstead.

This hospital is of recent construction, and it was only opened towards the end of December 1879. Between this date and the occasion of my visit the only cases of infectious diseases calling for isolation by the Sanitary Authority have been two children suffering from scarlet fever, who were removed to the hospital from an overcrowded dwelling in Aldbury. The mother of the patients, who were respectively six and ten years of age, wished to come in with them, but on finding her children comfortably housed she immediately left. No further spread took place in the village.

The cost incurred by the Rural Sanitary Authority in providing the hospital was as follows:—

	£	s.	d.
Purchase of site - - - - -	425	0	0
Contract for building - - - - -	1,626	0	0
Raising walls (extra), making rain-water tank, sink- ing well, pump, cesspool, &c. - - - - -	277	0	0
Construction of boundary wall - - - - -	80	0	0
Making road and path through grounds, &c. - - - - -	79	0	0
Architect's commission - - - - -	100	0	0
	£2,587	0	0
Providing two iron beds, with chain and wool mattresses, and sundries - - - - -	20	0	0
	£2,607	0	0

A man and his wife reside in the administrative block. When patients are under treatment the former is expected to give his whole time to the hospital, and the wife has to act as nurse if required; they, however, find their own board. At present they receive 20*l.* a year, with coals and light, and they have the privilege of making such use as they choose of the garden ground.

BIRKDALE URBAN SANITARY DISTRICT.

Population in 1881, 8,706. Rateable value (1880), 47,557*l.* 5*s.*

Before 1876 the Birkdale Urban Sanitary Authority had an arrangement with the Southport Infirmary for the reception of cases of infectious diseases into that institution, but early in that year the governing body of the infirmary determined, on account of the spread of small-pox within their buildings, no longer to receive infectious diseases.

Under these circumstances, when in June of that year small-pox became somewhat prevalent in their district, the Birkdale Urban Authority, with a view of isolating those cases not having proper lodging and accommodation, purchased two semi-detached cottages. Within three days of the purchase being effected the first patient was admitted, and at short intervals 8 out of a total of about 12 cases which occurred in the district were isolated, and the spread of the disease was effectually checked.

Spread of  
small-pox in  
infirmary  
buildings.



The two cottages referred to form one out of a long line of similar double cottages in Swire Road. One only of the two cottages was, however, at the time used as a hospital, and this is the only one now retained for that purpose. It is an ordinary villa-cottage, having two rooms and a scullery on the ground-floor, and three bedrooms upstairs. The three rooms allotted to patients contain from about 900 cubic feet to 1,370 cubic feet each, and they are so arranged that only one disease can safely be treated in the building at the same time.

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Site and construction of hospital.

Behind the two cottages is a piece of ground available for the hospital cottage, but not being properly enclosed it is not used for purposes of recreation, the patients remaining indoors until they leave.

Water is laid on from the Southport Waterworks. The only closet is a common privy-with-pit, which is also used as a receptacle for ashes and dry refuse. Behind the hospital cottage a Fraser's Disinfecting Oven has been fixed. It is managed by the inspector of nuisances, who, when using it, raises the heat to a maximum temperature of 240° Fahr., and also submits the articles to be disinfected to the fumes of burning sulphur. In a few instances articles have been scorched.

Disinfecting apparatus.

The admissions, in so far as they could be ascertained, together with the deaths in the urban district from the several diseases specified, have been as under:—

Admission of patients.

Date.	Small-pox.		Scarlet Fever.		Enteric Fever.		Diphtheria.	
	Deaths in the Urban District.	Cases admitted into Hospital.	Deaths in the Urban District.	Cases admitted into Hospital.	Deaths in the Urban District.	Cases admitted into Hospital.	Deaths in the Urban District.	Cases admitted into Hospital.
1876	2	8	0	0	3	0	0	0
1877	0	*	0	*	3	*	2	*
1878	0	0	1	0	2	1	11	3
1879	0	0	1	3	3	0	0	0

\* No record kept for this year.

One case of "cerebro-spinal meningitis" was also admitted in 1879.

Dr. C. H. Smith, the Medical Officer of Health, has administrative charge of the hospital, and he also attends such patients as do not at their own cost call in the services of another medical practitioner. For his attendance on patients Dr. Smith receives from the Sanitary Authority similar fees to those he charges in his private practice. A nurse resides at the hospital; she receives 10s. a week, together with fuel and lights, and also her board when any patients are under treatment.

Administration.

The fact of the hospital having been but little used may partly be due to its being but little fitted for the purposes to which it is put, but at the same time it should be stated that to a considerable extent Birkdale is a locality containing superior residences where ordinary means of isolation can be fairly well carried out. Such use as has been made of the hospital has, however, been eminently satisfactory. The spread of small-pox was successfully checked in 1876; in the three instances in which isolation of diphtheria cases was resorted to in 1878, no further attacks resulted; and a similar immunity from the spread of scarlet fever followed on the admission of the three cases of that disease in 1879.

Advantages attendant on isolation.

Hitherto the majority of the patients have either been domestic servants or comparatively poor persons. As a general rule patients are expected to repay the Authority the actual cost of their maintenance and medical attendance, together with the nurse's wages and board,

Repayments to Authority.

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Influence of  
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Sections 124  
and 132, Public  
Health Act,  
1875.

Influence of  
hospital on  
surrounding  
neighbour-  
hood.

Cost of main-  
tenance, &c.

during the time they remain under treatment. Payment is, however, never pressed when the patients are obviously poor, and the Medical Officer of Health, when suggesting removal to hospital, has authority, if he deems it necessary on account of poverty, to promise entire remission of all fees.

No action has been taken under either sections 124 or 132 of the Public Health Act, 1875. Measures were, however, taken in 1874 to enforce the removal to the infectious wards at the Southport Infirmary of a patient who was suffering from enteric fever whilst occupying an overcrowded dwelling. The order of the justices having been obtained the patient quietly submitted.

The situation of the hospital as regards neighbouring dwellings calls for some further notice. Fronting the row, of which the cottage forms a part, is an open space not yet built over. In actual contact with it on one side is the second semi-detached cottage referred to. This latter has since the beginning of 1879 been sub-let as a provident dispensary, which has an average daily attendance of five patients. None of the patients or their relatives have contracted scarlet fever: the only disease under treatment in the hospital since the establishment of the dispensary. The nearest of the other blocks of semi-detached cottages forming Swire Road is under 13 feet from the hospital. No case of infectious disease has occurred in this cottage since the hospital was established; indeed it is not within the knowledge of the Sanitary Authority or their officers that any such cases, except measles, which has not been received into the hospital, have occurred in any part of the road since the hospital was opened.

A 99 years' lease of the two cottages was purchased by the Authority at a cost of 500*l.*, subject to an annual ground rent of 3*l.* 1*s.* 9*d.* The fittings and furniture cost 80*l.*

During the two years ending March 1878 and 1879, the expenses of maintaining the hospital have been as follows:—

	Year ending March 1878.			Year ending March 1879.		
	£	s.	d.	£	s.	d.
Medical attendance ... ..	2	2	0	8	15	0
Nurse's salary ... ..	6	10	0	26	0	0
Food and medicine ... ..	4	3	3	9	18	5
Additional furniture, &c. ... ..	6	6	11	6	6	0
Incidental expenses ... ..	4	10	11	3	3	9
	23	13	1	54	3	2

The following amounts have, however, been received by the Sanitary Authority:—

	Year ending March 1878.			Year ending March 1879.		
	£	s.	d.	£	s.	d.
Repaid by patients ... ..	1	13	0	9	3	10
Rent of second cottage ... ..	3	7	0	3	5	0
	5	0	0	12	8	10

Thus the total cost to the Authority has been 18*l.* 13*s.* 1*d.* for the first, and 41*l.* 14*s.* 4*d.* for the second year.



## BIRKENHEAD URBAN SANITARY DISTRICT.

Population in 1881, 83,324. Rateable value, 409,302*l*.

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On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Site and soil.

In the autumn of 1875 the Urban Sanitary Authority of Birkenhead determined to provide a hospital for infectious diseases, and as they were in possession of a pair of semi-detached three-storied villas, standing in a small plot of ground, and being situated in a fairly isolated and easily accessible position on the northern outskirts of the inhabited parts of the town, but near the centre of the sanitary district, it was determined to utilise them for the purpose. The site, including a small open space in front of, and a somewhat larger one behind, the villas is 152 feet long and 75 feet broad, and it is bounded both on the east and west by a roadway. To the north is an open space some 140 feet wide, with houses beyond, and to the south are the grounds of the Borough General Hospital. The soil is boulder clay overlying the new red sandstone.

As altered early in 1876, the two villas now constitute one building. On the ground floor, and to the front, are two ward-rooms, which are separated from each other by a central portion of the building, containing the care-taker's sitting-room and bedroom; to the back is a room for the medical officer, and a kitchen; communication between the two wards being only possible by passing either into the outer air or through both the two latter rooms. On the same floor are a dispensary and a bath-room opening out of the medical officer's room, and also a "disinfecting room," which is approached from without. On the upper floor are four ward-rooms, occupying similar positions to the two wards and the care-taker's rooms downstairs, and two smaller rooms at the back. On this floor are also two bath-rooms and two water-closets, the latter communicating with the building by means of an unventilated lobby. Hospital build-  
ings.

The two wards downstairs each contain about 180 square feet and 1,800 cubic feet, and they are thus adapted to receive one patient each; they have bow-windows fitted with casement sashes, ventilators above the doors, and open fire places. On the first floor two of the wards each contain about 220 feet of floor space and 1,990 cubic feet, and two others, each about 160 feet of floor space and 1,640 cubic feet, thus giving accommodation for four more infectious cases. The two rooms at the back each contain about 138 feet of floor space and 1,250 cubic feet. All the rooms on this floor are provided with one window, which opens, and an open fireplace. Two rooms on the third floor are reserved for the nurses.

The "Villa-Hospital" may thus be deemed to afford accommodation for eight patients suffering from one or other of the infectious fevers. The rooms are, however, often occupied by children, and the hospital is hence deemed fit for the reception of a larger number of patients. The building does not possess proper means for the simultaneous treatment of two different infectious fevers, and in one instance a patient admitted with scarlet fever contracted small-pox whilst under treatment. Except under special circumstances, no other disease has ever been admitted when small-pox cases are under isolation.

A constant supply of water is laid on from the town mains. The drainage is into the public sewers, direct communication existing at some points between the latter and the interior of the building. [This direct communication has since been severed.] Water-supply  
and drainage.

The number of cases admitted into the hospital from the borough of Birkenhead, and the total deaths registered from the causes specified

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during the three years 1878-80\* are given in the following table; the admissions including a few patients from vessels lying either in the dock or in that portion of the river bordering upon Birkenhead.

				Small-pox.		Scarlet Fever.		Diphtheria.		Typhus Fever.		Enteric Fever, &c.		Measles and Hybrid Measles	
				Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1878	..	..	..	—	1	23	4	14	—	18	7	30	13	72	1
1879	..	..	..	—	1	125	11	19	2	15	1	19	5	23	6
1880	..	..	..	—	2	74	15	11	2	13	2	8	7	15	9
1878-80..	..	..	..	—	4	227	30	44	4	46	10	57	25	110	16

Inadequacy of hospital provision.

Payments by patients.

The inadequacy of the accommodation afforded for a borough such as Birkenhead, having a large population belonging to the working classes, and being situated on the Mersey, is obvious. The hospital is, however, rarely full, and this is probably to be accounted for by the fact that the isolation which it affords is in all cases dependent on payment; the amount charged being 2s. a day to residents within the borough, and 4s. a day to boys from the "Conway" training ship; the latter sum covering all expenses except interest on the original outlay.

Referring to this subject in his annual report for 1876, Dr. Vacher, the borough medical officer of health, writes:—"The fever hospital is of great service in providing the means of isolating a few specially circumstanced infected subjects whose friends can afford to pay small maintenance charges; but this is the utmost it can, or was ever intended to, accomplish. Whilst recognizing all the good it has done it would be absurd to contend for one moment that it adequately meets the wants of the district as regards hospital accommodation for the sick from infectious diseases . . . . It not unfrequently happens that those affected with infectious disease cannot afford to pay a charge of 14s. a week, and are not yet so destitute as to bring them within the operation of the poor law; and such patients may be the initial cases of an epidemic. The case of the three children who suffered from small-pox in August last furnishes an apt illustration of the helplessness of the sanitary authority when the head of the family in which an outbreak occurs, is in poor circumstances, and yet not a pauper."

The usefulness of the hospital in staying the spread of infection, though alleged to have been very marked in certain special instances, is also at times frustrated owing to the absence of early intimations as to the existence of infectious disease. Owing to this, second and third cases of scarlet fever, &c. have in several instances arisen after the removal of the first patient attacked.

Before admission, patients or their friends are obliged to sign a guarantee as to payment; and, except when several heads of families died during the small-pox epidemic in 1877, the bad debts have not exceeded four per cent. No remission of expenses has in any case been

Public Health Act, 1875, ss. 132 & 124.

\* In August 1877, a charter of incorporation was granted to Birkenhead, and the area of the district was considerably enlarged.



allowed, and no action has been taken under section 132 of the Public Health Act, 1875. In August 1878 three children suffering from enteric fever were removed to the hospital by the magistrate's order, obtained under section 124 of the Public Health Act, and in some instances, as is the case of milk-vendors, very strong moral pressure and reference to the powers possessed by the sanitary authority under that section have also been resorted to.

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Of the 89 patients referred to as admitted in the three years, 1878-80 20 varied in age from 2 years to 10 years. Occasionally a mother or a friend has been admitted for a time with some of the younger children; payment for maintenance being made at the same rate as in the case of patients.

Ages of patients.

The social status of the more recent patients admitted has been as under. No paupers are admitted; a decision to that effect having been arrived at, amongst other reasons, because in the present building they could not be kept apart from other patients:—

Social status

Mechanics, labourers, &c.	-	-	-	-	-	33
Domestic servants	-	-	-	-	-	30
Pupils from "Conway" training ship	-	-	-	-	-	18
Sailors	-	-	-	-	-	12
Scholars, apprentices, clerks, &c.	-	-	-	-	-	9
Trademen and publicans	-	-	-	-	-	6
Hospital staff	-	-	-	-	-	2
Merchant captain	-	-	-	-	-	1
Warehouseman	-	-	-	-	-	1
Professional	-	-	-	-	-	1
Gentleman	-	-	-	-	-	1
Dressmaker	-	-	-	-	-	1
Farmer	-	-	-	-	-	1

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In the "Hospital Return" made to the Local Government Board in 1879 by the sanitary authorities of the Higher Bebington urban district, and the rural district of Birkenhead, this hospital was referred to as being available for those districts. In July 1878, however, the Corporation passed a resolution to the effect "That from henceforth no patients from without the incorporated area be received into the fever hospital,"\* and although four such patients were admitted in 1879, and two in 1880, some special reason, such as the physical condition of the patient, in each case necessitated a departure from the rule laid down.

Use of hospital by,—  
(a.) Higher Bebington urban district.  
(b.) Birkenhead rural district.

Dr. Vacher has the general administrative and the medical charge of the hospital, and apart from the "Conway" boys, who are visited by the medical officer of the ship, he attends, hitherto without any fee, all patients who do not at their own cost call in the services of another practitioner. A care-taker and his wife are the only two permanent resident officers; they receive a salary of 30s. a week, and are expected to find their own board both when patients are under treatment and when the hospital is empty. Nurses are easily procured from Liverpool and elsewhere as they are needed.

General and medical administration.

The ambulance belonging to the guardians, and which admits of a patient being removed in a recumbent position, is used for the purposes of the hospital.

Ambulance.

\* Annual Report of the Medical Officer of Health for Birkenhead, 1878.

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On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Disinfecting  
stoves; des-  
tructor, &c.

Until recently the only disinfecting apparatus available has been one limited to the purposes of the hospital; it is contained in the "disinfecting room," which also serves as a mortuary. This room is fitted with a large iron box, beneath which are five rows of gas jets. The sides of the box consist of two layers of sheet iron, about two inches apart, but the lid is only one quarter of an inch in thickness. Inside, the apparatus is fitted with wooden laths, on which to rest the articles needing disinfection. I am informed that the temperature of this stove can be raised to  $250^{\circ}$  F., as indicated by a thermometer, the bulb of which is a few inches from the inner side of the box, but great difficulty and expenditure of time are experienced in effecting this, and as all articles placed in it are first subjected in the wards to the fumes of burning sulphur, the stove has for some time past never been raised beyond  $150^{\circ}$  F.; this temperature being maintained for four hours. Owing, however, amongst other reasons, to the imperfect means of disinfection available, a large amount of bedding, clothing, &c., has on several occasions been destroyed. Thus when small-pox was prevalent in 1877, compensation for such articles was given by the sanitary authority, to the amount of 499*l.* 10*s.* 5*d.*

Behind the hospital premises a "Disinfecting Station" for the town has recently been erected. It consists of two disinfecting chambers, a chamber for the destruction of infected articles, and of a covered shed; the whole being enclosed in a yard, which is entered from the road at the back of the hospital. The two disinfecting chambers are built over a single underground furnace; they are of brickwork, with arched roofs, and they are fitted with a "horse" on wheels, and with shelves of open woodwork, large enough to hold a single mattress or bed. The floor and the doors are of iron, the former being perforated. In the roof of each is a flue communicating with a chimney shaft. At the date of my visit these stoves had only been used some half-dozen times, and no experiments had been made to ascertain how far the temperature penetrated such articles as beds and pillows, nor as to its equal distribution throughout all parts of the chambers. I was, however, informed that the stoves could easily be raised, in about two hours, to a temperature of  $240^{\circ}$  F., as indicated by a thermometer hung near the inner surface of the oven door, and that they could be maintained at this temperature for a period of five additional hours, the total consumption of fuel amounting to about six hundredweight of coal. No article had been scorched or damaged, but the officer in charge informed me that when on one occasion he approached a temperature of  $260^{\circ}$  F. there was a smell "as of scorching." The "destructor" is of very similar construction to the disinfecting chambers. The floor, however, consists merely of an iron grating open to a fire below. A flue in the roof joins the chimney shaft belonging to the stoves. The establishment was constructed by Messrs. Tessimond and Kissack of 10, Blackstock Street, Liverpool. As yet no conveyances have been provided for fetching and returning articles from infected houses, an open hired cart being used for the purpose. [Special conveyances have been ordered since the date of my visit.] A charge has hitherto been made for disinfection, but it is not pressed in the case of the poor.

Apart from the general hospital, which stands in grounds adjoining the villa-hospital premises and at a distance of 135 feet from the villas themselves, the nearest dwellings to the latter belong to a row of houses in Beckwith Street, about 145 feet distant. The only instance in which any suspicion as to the spread of infection from the hospital has arisen was in the case of the resident medical officer to the general hospital, who contracted small-pox in 1877, when the hospital for infectious

Influence of  
hospital on  
surrounding  
neighbour-  
hood.



diseases contained a considerable number of small-pox patients. The disease was, however, at the time epidemic in the borough, and in his daily attendance upon a large number of dispensary patients, some of whom, at least, must, I am informed, almost necessarily have come from infected houses, the officer attacked can hardly have failed to have come into contact with much more direct sources of infection; besides which, whereas the average number of in-patients and resident staff is some 33, no other persons within the general hospital contracted the disease.

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On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

The expenses originally incurred in converting the two villas into a hospital for infectious diseases were as follows:—

Cost of construction and of maintenance.

	£	s.	d.
Value of villas* (estimated) - - -	500	0	0
Alterations and improvements - - -	502	10	1
Furnishing - - - - -	363	6	11
Disinfecting apparatus - - - - -	50	8	5
Dispensary fittings, drugs, &c. - - -	25	18	4
Hospital books, forms, &c. - - - - -	9	12	3
<b>Total - - - - -</b>	<b>£1,451</b>	<b>16</b>	<b>0</b>

For the year ending 25th March 1879, and after deducting certain expenses borne by the authorities of outlying districts from which patients had been received, the total cost incurred in maintaining the hospital was 355*l.* 3*s.* 8*d.*, and this was reduced by 167*l.* 3*s.* 0*d.* received on behalf of patients admitted from the borough. For the year ending 25th March 1880 the corresponding sums incurred for maintenance and received on behalf of patients were 220*l.* 1*s.* 2*d.* and 81*l.* 19*s.* 6*d.* respectively.

#### BIRMINGHAM URBAN SANITARY DISTRICT.

Population in 1881, 402,296. Rateable value, 1,493,800*l.*

In the autumn of 1871, and owing to a prevalence of small-pox, the guardians of the Birmingham Union erected on a plot of land belonging to them, eight detached wooden ward-pavilions and certain outbuildings, for the purposes of isolating small-pox patients. In 1874 the premises were, however, leased to the Corporation, a condition of the transfer being that both in-door and out-door paupers were to be admitted from the Birmingham Union. Two more ward-pavilions and other buildings were shortly after this added by the Corporation.

Small-pox leading to hospital provision.

The site is a triangular piece of land of somewhat under two acres in extent. It is situated within the urban district, at a distance of about 2 miles from its centre and near its north-western boundary. The apex of the triangle, where the entrance is situated, lies about 55 feet from the Western Road, and the sides are bounded by the workhouse grounds to the north and east, and by a canal to the south.

Site.

The present buildings consist of 10 wooden pavilions, nine of which are used as wards and one for the purposes of the matron and for stores; and of a number of detached outbuildings, some of wood and some of brickwork. These outbuildings include a kitchen, &c., a room for nurses and servants, laundry, surgery, mortuary, lodge, store-rooms, &c. The larger portion of the site not occupied by buildings is laid out as garden ground, but it affords only a very limited space for the purposes of recreation.

Hospital buildings.

\* When these villas were erected their value was much greater: all house property has, however, since then become much depreciated in the district in question.

The two detached ward-pavilions erected by the Corporation are somewhat substantially built. The foundations and the chimney shafts are of brickwork, the walls consist of timber framework carrying two layers of wood some 5 inches apart, and the roofs, which are of somewhat similar construction, are slated outside. Inside, the woodwork is stained and varnished, and the furniture and fittings are such as to give to the wards an air of considerable comfort. Each of these wards has a floor-space of about 1,720 square feet and a capacity of about 27,000 cubic feet; they are thus each adapted to receive some 12 or 13 fever patients, but they are provided with nearly twice that number of beds. The windows, which are fixed in the two opposite side walls, are 12 in number, six on either side, and they consist of double-hung sashes surmounted by a hinged sash above. Additional means of ventilation are afforded by openings fitted with sliding covers just above the floor level and of louvred shafts opening out above the roof. At one end of each pavilion is an entrance lobby, a nurses' day-room, a lavatory, and two earth-closets.

The wards are warmed by means of four open fireplaces, two on either side of two chimney shafts fixed down the central line of the wards. There are no records of the ward temperature during the colder months of the year, nor is it known to what extent window-ventilation was then maintained, but it appears certain that all four fires being kept burning night and day no complaints were made on the score of cold.

In one pavilion the entrance lobby which in each case separates the earth-closets from the wards, is provided with means of cross-ventilation; in the other there is only means of ventilation into the outer air on one side.

The seven older ward-pavilions need no detailed description. They are, however, of very inferior construction, and unless it is absolutely necessary some of them are not used during the winter months. The ward doors open directly into the outer air; in some pavilions the ward itself is open to the slates; in others light and ventilation are partly obtained by means of skylights, and there is no cross-ventilation between the earth-closets and the wards. Allowing a floor-space of about 144 square feet, and some 2,000 cubic feet per bed, these seven pavilions together afford accommodation for some 50 patients, making with the two others a total accommodation for some 74 patients; they are, however, deemed to suffice for more than double that number.

The water-supply is from the Corporation mains. The drainage is into the public sewers, there being no direct communication between them and the interior of any of the buildings.

The records of the hospital which were available were not such as to enable me to compile any complete return of the total admissions from the two infectious fevers which are admitted, namely, small-pox and scarlet fever, or of the social status and age of the patients during recent years, but according to a return, made to the Local Government Board early in 1879, the admissions are given as under:—

Date.					Small-pox.	Scarlet Fever.
1876	...	...	...	...	12	43
1877	...	...	...	...	35	42
1878	...	...	...	...	22	429



Neither could I form an estimate as to the total amount of isolation effected as regards cases of infectious diseases arising in the borough, because cases of scarlet fever are also admitted into three general-hospitals, and the number thus isolated includes an unknown proportion of persons received from beyond the borough boundaries. But when it is stated that during the three years 1877-79 the deaths registered in the borough included 1,534 from scarlet fever, 378 from "fever," and 206 from diphtheria, and also that the borough hospital for infectious diseases is, according to returns made to the Local Government Board, deemed available for the purposes of the urban sanitary districts of Aston Manor and Saltley, and for those of the rural sanitary districts of Aston and Solihull, in addition to the requirements of the borough of Birmingham, it will be obvious how inadequate the provision is. Occasional patients from other districts are also admitted, the total cases sent in by authorities of other districts than the borough of Birmingham during the three years 1878-80 being as follows:—

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Inadequacy of hospital accommodation.

Authority.	Small-pox.			Scarlet Fever.		
	1878.	1879.	1880.	1878.	1879.	1880.
Aston Manor, Urban ... ..	—	—	—	1	—	—
Balsall Heath, Urban ... ..	—	—	—	1	—	—
Handsworth, Urban ... ..	—	—	—	—	—	1
Saltley, Urban ... ..	—	—	—	—	1	—
King's Norton, Rural ... ..	—	—	2	1	—	—
Solihull, Rural ... ..	—	—	—	1	—	1
Aston Poor Law Guardians ... ..	—	—	—	1	6	13

And further, such accommodation as exists is, as already stated, limited to the isolation of two of the infectious fevers only; the patients admitted consist, owing both to the nature and the locality of the buildings, almost exclusively of the poorer of the wage-earning classes, domestic servants and paupers; and the site is already so fully built on as to forbid the idea of any extension of buildings. The paupers admitted in the 12 months preceding my visit were all children, and their pauper clothing has always been replaced by a hospital dress, which is not a uniform. In a few instances in which patients of the better classes have been admitted they have, as far as possible, been provided with separate accommodation. No charge is made to non-pauper patients resident in the borough, those resident outside the borough are charged 30s. a week, and the guardians pay 3s. a day for every pauper sent in.

Admission of paupers.

The hospital staff consists of a non-resident medical officer, Mr. W. Bates, M.R.C.S., who undertakes the general and medical charge of the hospital and of the patients; and also of several residents, including the matron, nurses, servants, porter, &c. Any medical practitioner is at liberty to continue his attendance on any patient sent into the hospital, at the patients own cost, but owing to the social status of the patients

General and medical administration

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admitted, this permission has not, as far as I can ascertain, ever been acted upon.

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Disinfecting station.

Birmingham possesses an excellent Disinfecting Station in the Bacchus Road. In every essential respect this station resembles that described at Nottingham, and it is also fitted with one of the stoves designed by Dr. W. H. Ranson, F.R.S., and manufactured by Messrs. Goddard and Massey of Nottingham. It also contains a residence for the officer in charge of the station; sheds for two vans in which to fetch and return articles sent for disinfection, and for two ambulances; together with stabling, &c. From the present officer who has been employed at the disinfecting station during the last three years and a half I learn that the stove is in constant use, that it is always heated to a temperature of about 248° F., and that he has never known any articles to be damaged in it. The articles dealt with in it during the last three years, 1878-80 are as under:—

	1878.	1879.	1880.
Bolsters and pillars ... ..	899	586	317
Mattresses ... ..	290	339	229
Blankets ... ..	353	241	113
Beds ... ..	466	221	128
Sheets ... ..	424	192	73
Counterpanes ... ..	262	154	70
Articles of clothing, &c. ... ..	4,282	2,645	1,632
	6,976	4,378	2,562

No charge is made to any persons resident within the borough for the stoving of infected articles, but to persons resident elsewhere a charge of 5s., together with a small mileage fee, is made each time the stove is used. One wall of the disinfecting station is in contact with a row of dwelling-houses, but no spread of infection has ever been known or suggested to have resulted from it.

Ambulances.

Two ambulances are kept at this station, one being reserved for small-pox, the other for cases of scarlet fever. Both in external appearance, resemble an ordinary good-sized brougham; they each contain a movable stretcher on which the patient can lie at full length, the feet passing beneath the driver's seat; and there is a seat inside for an attendant. These ambulances were manufactured by Mr. R. Thomson, Broad Street, Birmingham, at a cost of 70*l.* each.

Influence of the hospital on the surrounding neighbourhood.

So far as ordinary dwelling-houses are concerned the position which the borough hospital for infectious diseases occupies is a well isolated one. Some of the workhouse buildings are, however, in somewhat close proximity to it. The nearest of these buildings is a two-storied bakery, which is in immediate contact with the hospital enclosure wall; and another, which is always in occupation by day and by night, lies 164 feet from the nearest pavilion. The workhouse inmates and staff vary in number from about 2,000 to 2,500, but, after inquiry, I cannot learn that any spread of infection has ever resulted from the near contiguity of the two premises. With regard to this statement it should be remembered that in 1875, when small-pox was prevalent in the borough, the pavilions for some considerable time contained over 100 patients suffering from that disease.

Cost of construction and maintenance, &c.

In connexion with the expenses incurred in the construction of this hospital, I find that the last of the two pavilions erected by the Corporation cost 770*l.* The cost of maintaining the hospital and the sums



repaid by patients and by the guardians during the two years 1879-80 were as follows:—

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	1879.	1880.
	£ s. d.	£ s. d.
Rent ... ..	150 0 0	200 0 0
Medical officer ... ..	200 0 0	225 0 0
Matron ... ..	50 0 0	60 0 0
Wages of permanent staff ... ..	245 19 3	154 6 9
Current expenses ... ..	1,232 12 3	1,062 18 9
	£1,878 11 6	£1,702 5 6
Repaid by patients, guardians, and sanitary authorities ... ..	1,241 2 0	623 6 1
	£ 637 9 6	£1,078 19 5

BLACKPOOL URBAN SANITARY DISTRICT.

Population in 1881, 14,448. Rateable value, 99,533*l*.

The hospital for infectious diseases, which is locally known as the Sanatorium, lies within the borough, and about one mile to the east of and from the centre of its most populous portion. The site covers only about half an acre of land, and it is so situated close to and behind the cemetery as to be almost entirely hidden from view. It is approached from the public thoroughfare by a roadway running close to the cemetery wall. The soil is clay.

Site and soil.

The buildings consist of a wooden ward-pavilion standing on brick foundations; certain administrative rooms which are built of brick, and are in unbroken communication with the pavilion; a detached building containing an old cab lined partly with leather, and partly with cloth; and also a room in which infected articles can be subjected to the fumes of burning sulphur.

Hospital buildings.

The Ward-Pavilion is a timber building having five-inch double-boarded walls. The roof is covered with slate; and the whole of the wood-work, including the roof-lining and internal partitions, is of varnished pitch-pine. It is divided into two wards by means of a wooden partition which passes down the centre from end to end, and which reaches to within five feet of the ridge of the roof. The wards contain five beds each, and they each measure 34 feet long by 15 feet wide, and have a total capacity of 8,178 cubic feet. A certain amount of cross-ventilation is secured by means of windows in the external side walls of the pavilion, and louvred ventilators are also fixed in the roof. Out of each ward opens an ill-contrived and ill-ventilated watercloset. The building is heated by means of stoves and hot-water pipes. There is no laundry, and hence the laundry work has to be performed either in the scullery or in the open air, according to the state of the weather. A mortuary in the adjoining cemetery is used for the purposes of the hospital whenever required. The drainage is into a cess-pool which has means of overflow into a neighbouring dyke. The water-supply is from the town mains.

The hospital was erected in 1876, but until 1879 no proper record was kept as to the number of patients admitted. The annexed Table in which the admissions from certain specified diseases are compared with the deaths registered from those causes in the borough is, however, believed to be correct.

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Diseases, by  
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Date.					Small-pox.		Scarlet Fevcr.		Diphtheria.		"Fever."	
					Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1876	..	...	...	...	1	2	3	—	2	—	1	—
1877	...	...	...	...	—	3	10	2	1	1	4	1
1878	...	...	...	...	—	—	26	4	—	—	19	5
1879	...	...	...	...	—	—	33	4	1	1	4	2
1880	...	...	...	...	—	—	22	4	1	—	12	3
1876-80	...	...	...	...	1	5	94	14	5	2	40	11

Notification of  
infectious  
diseases.

Under section 75 of the Blackpool Improvement Act, 1879, a copy of which is appended, the Corporation acquired powers for the compulsory notification of infectious diseases. In 1880, the number of cases reported under the Act included 66 of scarlet fever and 43 of "fever," but up to the date of my visit in May 1881, this notification, although it had led to a considerable increase of such sanitary work as the cleansing and disinfection of infected houses, had not resulted in any increased isolation of infectious diseases in hospital. On inquiring as to the causes of this, I found that they were several. In the first place the position of the hospital with regard to the cemetery had from the first hindered its proper use, and this cause still remains in operation. Secondly, the nature of the accommodation provided, limited as it is to the reception, in public wards only, of cases of one disease in both sexes, is known to be a reason why many medical practitioners feel themselves unable to recommend its use to their patients, whether visitors or residents. In the third place paupers from the borough have been admitted since the beginning of 1879, and although only one or two such patients have as yet been received, this is also known seriously to affect the use of the hospital; indeed before the admission of paupers had been sanctioned, it was found much more easy than now to secure the isolation of visitors. Referring to the hospital in his Annual Report for 1879, Dr. Leslie Jones, medical officer of health for the borough, says:—"The medical men in the town appear to be unwilling to transfer their patients to the sanatorium, and the resident public, probably from its situation in close proximity to the cemetery, have a great aversion to avail themselves of it. The sanatorium contains but two wards, male and female, and is consequently unfitted for the reception of various contagious diseases" at one and the same time. Practically the sanatorium, as a hospital for infectious diseases, is useless." Again, in a special report in 1880, Dr. Leslie Jones writes:—"Had we a suitable institution for the reception of fever cases of different types, I do not doubt that the aversion which at present exists to the sanatorium both among the public and the profession would be removed, and the most important of all means of checking disease would be at our disposal."

The general administration of the hospital is in the hands of Dr. Leslie Jones; and a carekeeper and his wife reside on the premises. The

General  
administra-  
tion, medical  
attendance, &c.



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Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Cost of con-  
struction.

Cost of main-  
tenance, &c.

Notice to be  
given of  
persons suffer-  
ing from cer-  
tain diseases.

patients are attended by medical practitioners of their own choice and at their own cost; paupers coming under the care of the poor law medical officer.

The site on which the hospital stands is leased at a rental of 4*l.* a year; the construction of the buildings, roadway, &c., cost 932*l.* 12*s.* 9*d.*, and the furniture, fittings, &c., 151*l.* 15*s.* 3*d.* The carekeeper and his wife receive 30*s.* a week together with fuel and lights, and they provide their own board, both when patients are under treatment and when the hospital is empty.

Visitors are charged for at the rate of 1*l.* 1*s.*, ratepayers at 15*s.*, and servants and paupers at 10*s.* 6*d.* a week. This charge includes ordinary diet, but wine and any luxuries have to be provided for by the patients themselves by arrangement with the carekeeper or otherwise. Under these circumstances no complete estimate as to cost of maintenance can be made.

### THE BLACKPOOL IMPROVEMENT ACT, 1879.

75. In order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation who is suffering from small-pox infectious cholera measles typhus typhoid scarlet relapsing or puerperal fever or diphtheria the following provisions shall have effect (that is to say):

If any such inmate be suffering from any such disease as aforesaid the occupier or person having the management or control of such building (or if such occupier or person be prevented by reason of such disease then the person in charge of such inmate) shall, so soon as he shall become aware of the existence in any such inmate of any such disease forthwith give notice to the medical officer of health of the Corporation at his residence or office of the existence in such inmate of such disease;

If such inmate be not a member of the family of such occupier or person the head of the family (resident in such building) to which such inmate belongs, or if there be no such head then such inmate (unless prevented by reason of such disease or of youth) shall on becoming aware of the existence in such inmate or in his own person as the case may be of such disease forthwith give notice thereof to such occupier or person;

The Corporation shall provide and supply gratuitously to every registered medical practitioner resident or practising in the Borough forms for the certificate or declaration to be made by such medical practitioner of the particulars herein-after mentioned in relation to such cases according to the form set forth in the Fifth Schedule to this Act;\*

Every medical practitioner attending on or called in professionally to visit such inmate shall on becoming aware that such inmate is suffering from any such disease as aforesaid forthwith fill up, sign, and send to the medical officer of health of the Corporation at his residence or office a certificate or declaration stating according to the forms prescribed and supplied to him by the Corporation the name of such inmate the situation of such building and the name of such occupier or person;

The Corporation shall pay to every medical practitioner who shall in pursuance of this section duly make and give any such certificate or

#### \* THE FIFTH SCHEDULE.

Certificate of Disease, &c. under Section 75.  
BLACKPOOL IMPROVEMENT ACT, 1879.  
Section 75.

To the Corporation of the Borough of Blackpool. Pursuant to the above-mentioned Act I hereby certify and declare that in my opinion the under-mentioned person is suffering from a disease within the terms of such section.

Dated the \_\_\_\_\_ day of \_\_\_\_\_ 18 \_\_\_\_  
(Signed)

Name of person suffering from the disease.

Situation of the building wherein such person is.

Name of occupier or other person having the charge, management, or control of the building or room.

Nature of disease.

NOTE.—This certificate must (under penalty of ten pounds in case of neglect) be forthwith sent to the Medical Officer of Health of the Corporation at his Residence or Office.

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declaration a fee of two shillings and sixpence for each such certificate or declaration, but only one such certificate need be given, and only one such fee shall be payable within an interval of thirty days to the same medical practitioner in respect of the same disease occurring in the same building ;

And any person who shall wilfully offend against this enactment shall for every such offence be liable to a penalty not exceeding ten pounds.

## BRADFORD URBAN SANITARY DISTRICT.

Population in 1881, 183,032. Rateable value, 885,477/.

Origin of the  
hospital.

In 1867 a gentleman who desired that his name should not be made public, presented to the Board of Management of the Bradford Infirmary a sum amounting to nearly 4,000/ for the erection and maintenance of a "fever hospital." The Committee which was appointed to carry out the donor's intention proposed in the first instance to rent some existing building, but a second sum of 5,000/ being contributed by another gentleman towards the same object, it was felt that steps should at once be taken to erect a building specially adapted to the isolation and treatment of infectious diseases. A site was therefore purchased at a cost of 3,500/., including the making of roads and the erection of an enclosure wall. Later on a third sum of 3,000/ was presented to the Committee by an unknown donor, and this being supplemented by other contributions, a sum of 22,500/ was ultimately raised, the area of the original site was somewhat enlarged, and the "Bradford Fever Hospital," as designed by Messrs. Andrews & Pepper, architects, of Bradford, was erected. During the erection of the hospital buildings the original design was somewhat departed from, and recently one of the ward-pavilions has undergone material alterations. A detached small-pox pavilion has all along formed part of the original scheme, but as it has not yet been erected, one or more of the other pavilions have on several occasions been set apart for the reception of cases of that disease.

Site and soil.

The hospital site as enlarged consists of nearly eight acres of land occupying an elevated position on the outskirts of the borough of Bradford, about one mile to the east of its most central portion. It is surrounded by a stone wall about 5 feet 6 inches high. The soil is clay.

Hospital  
buildings.

The hospital buildings consist of an administrative block, seven ward-pavilions, and certain outbuildings. They are throughout constructed of stone, lined with brick. All outer walls are 21 inches in thickness, including a 2-inch cavity.

The administrative block is a large building consisting of three stories and an extensive basement. It contains a board-room, the private apartments of the resident medical officer and of the matron, kitchens, &c. for the whole hospital, together with bedrooms for the nurses and servants. A corridor, which admits of cross-ventilation by means of windows, leads from the administrative block, and at a distance of 110 feet to the south of it, it joins another corridor running from east to west. This corridor is some 230 feet in length, and 10 feet in width, it admits of cross-ventilation by means of windows, and it has on either side of it, and facing each other, three one-storied ward-pavilions, standing at distances varying from about 50 feet to 60 feet apart, and having their opposite side walls facing as nearly as possible east and west.

The three pavilions lying to the south of the corridor contain the principal wards. Each of these is approached from the corridor by means of a passage, having on one side a nurse's room fitted with a fixed window looking into the ward, and a scullery, and on the other side a room measuring 17 feet by 10 feet by 14 feet high, which can be used either for a private patient, or as an "isolation room." Each of



the principal wards is 55 feet 6 inches long, and 27 feet wide. Their height is 14 feet at the sides, and 18 feet to the horizontal part of the ceiling at the collar of the roof. There are 10 beds in each of these wards, each bed thus having 149 feet of floor area, and some 2,400 cubic feet.

The floors are of well-laid oak, and the walls of Parian cement. There are, in all, 12 windows in each ward, five in one and four in the other of the two opposite side walls, and three in the outer end wall. The windows are 9 feet high, and 5 feet 6 inches across; their sills are 2 feet above the floor level, and the tops are 2 feet 9 inches below the wall-plate. Each window consists of two fixed sashes, surmounted by a frame hung on a central pivot; and this frame is thus the only part which opens. There are also ventilating openings just above the floor level, Sherringham ventilators just below the wall-plate, and a large ventilating shaft, fitted with a diaphragm, and opening out through the ceiling above the roof. Two large stoves occupy a position in the central line of the wards, their flues passing beneath the floor. Opening out from the ward on the side where there are only four windows a projecting building, which is separated from the ward by means of a lobby provided with means of cross-ventilation. This building itself has similar means of ventilation, and it contains a water-closet, urinal, ward-sink, and a linen-shoot. Through the latter all foul or dirty linen can at any moment be thrown into a basket standing in the outer air below. In each of these pavilions, and indeed nearly throughout the hospital, the baths are fixed in the centre of the wards; this arrangement being deemed the most convenient, since bathing forms an essential part of the treatment adopted, especially in scarlet fever. Except when bathing is in progress the baths serve as ward tables, two hinged wooden flaps forming the top of the table. The waste pipes of these baths are carried into the open air.

To the north of the corridor and immediately facing the larger pavilions, are three small pavilions, each containing a single ward. Two of these small pavilions are, owing to the slope of the surface, at a higher level than the principal ones. The single wards within them, each measure 27 feet by 22 feet 6 inches, and 16 feet in height. They contain windows in all four walls, they are warmed by open fire-places, and are provided with projecting buildings containing water-closets, &c. similar to those attached to the larger wards. Each of these smaller wards contains four beds, there being thus some 150 square feet and some 2,430 cubic feet per bed. At one end of the corridor upon which the pavilions open is a room originally intended as a "receiving room," although not now so used, and projecting from it between two of the larger pavilions is a building containing a dispensary and water-closets for the staff.

When the hospital was originally designed it was intended to erect a fourth large and small pavilion at the eastern end of the corridor. This has, however, as yet not been carried out. The smaller pavilions were also intended to receive the convalescents from the larger wards opposite to which they are situated, but this classification of patients has hitherto been found impracticable. The end of the corridor is, however, so fitted with doors that one large and one small pavilion can be cut off from the others, a covered way, open at the sides, intervening; and when necessary these are reserved for cases of small-pox. These latter wards can also be reached without entering the corridor common to the other wards.

The seventh pavilion, which is reserved for scarlet-fever patients, has recently been reconstructed. It is reached from the administrative block by means of a covered way, which consists of a foot-road beneath



a hipped roof, and it is divided down the middle by a partition, partly of wood and partly of glass, which extends up to the ridge of, and supports, the roof. It thus forms two distinct covered ways, each of which is open to the air at one side, but completely protected on the other; and one or other footway can be chosen according as the wind, rain, or snow drives in one or other direction.

The scarlet-fever pavilion is, with the exception of one part in the centre, a one-storied building, and it contains two general wards, two small wards for acute cases, four private wards, and a nurse's day-room, which is fitted as a ward-kitchen. Above the private wards is an upper floor containing nurses' bedrooms. The day-room for nurses on the ground floor occupies the centre of the building. It is lighted by means of a skylight, it opens directly into the two general wards on either side, the doors being fitted with glass panels, and it has fixed windows looking into two of the private wards in front and into the two small wards behind. The general wards are oblong in shape, but they are encroached upon at one angle by one of the convalescent wards. They each contain about 1,074 square feet, and have, like the wards in the other pavilions, a mean height of 16 feet, giving a total cubic capacity of somewhat over 17,180 cubic feet. They were not furnished at the date of my visit, but they are intended to hold eight or nine adult patients. These wards have two windows in each of the opposite side walls, which have respectively a northern and a southern aspect, and three in the outer end wall. With the important exception that, in the private wards and the nurses' bedrooms, the sashes are made to open, the windows throughout this pavilion resemble those in the other wards already described. The wards are also provided with the same additional means of ventilation as exist in those previously described; they each contain a fixed bath, and they are warmed by one central stove having an open fire-grate. The four private wards are for single patients. They each measure 20 feet by 18 feet by 16 feet in height; they have windows in two adjacent walls, and are each fitted with an open fire-place and a fixed bath. The small wards for acute cases, are 22 feet by 14 feet by 16 feet high, and they are each intended for two patients. Excepting the absence of a fixed bath, they, in every essential respect, resemble the private wards.

The waterclosets and sinks both for the general and the private wards are contained in projecting buildings, and in the main resemble those described in connexion with the principal pavilions; one such projection, however, serves for two private wards, the cross-ventilated lobby being common to both. The watercloset projections for each of the convalescent wards, though themselves provided with ample means of ventilation, open directly into the wards; they each also contain a fixed bath.

In all, the hospital now contains 68 beds.

There are four separate outbuildings. One contains the wash-house, laundry fitted with a steam engine, and drying closet; a second contains the ambulance shed and stabling; the third consists of a dead-house and post-mortem room; and the fourth contains the disinfecting apparatus, to which further reference will be made.

Water-supply  
and drainage.

The water-supply is from the Corporation mains, and the drainage is into the public sewers. A ventilating shaft is provided at the head of the hospital drain, but the communication between it and some parts of the hospital buildings is apparently not broken by an intervening air-space.

Admission  
from all  
sources.

The hospital was opened in January 1872, and the admissions during the nine years ending 1880 have been as follows:—



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Date.	Small-pox.	Scarlet Fever.	Diphtheria.	Enteric Fever.	Typhus.	Febricula, &c.	Measles.	Erysipelas.	Other Diseases.	Total.
1872 ...	63	14	0	48	3	8	0	1	25	162
1873 ...	94	19	0	54	4	14	0	1	17	203
1874 ...	250	58	0	51	0	17	8	0	28	412
1875 ...	20	103	0	44	4	10	0	0	23	204
1876 ...	12	35	0	40	7	5	3	1	10	113
1877 ...	19	72	0	65	3	5	0	2	17	183
1878 ...	5	148	2	55	0	6	1	2	18	237
1879 ...	8	159	3	24	2	2	0	0	16	214
1880 ...	2	248	6	60	2	9	5	2	30	364
1872-80 .	473	856	11	441	5	76	17	9	184	2,092

The above patients are, however, not all received from the borough of Bradford, the hospital having been established for the reception of cases of infectious diseases occurring both in Bradford "and the neighbourhood." The admissions from Bradford itself have, with the assistance of Mr. W. K. Rix, the resident medical officer, and of the secretary, been procured for the three years 1878-80; to these have been added 33 cases of scarlet fever, 59 cases of "fever," and 21 cases of measles, which occurred amongst paupers in the borough, but were isolated in the infectious wards at the workhouse, and the total number of cases thus isolated is compared with the total deaths registered in the borough from the causes specified:—

Admissions from the borough to the Fever Hospital and the Workhouse Infectious Wards.

Date.	Small-pox.		Scarlet Fever.		Diphtheria.		"Fever."		Measles.		Other Diseases.	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1878 ...	1	5	156	161	20	2	71	72	51	1	?	4
1879 ...	0	8	181	161	20	3	44	40	86	20	?	4
1880 ...	1	2	189	255	18	8	55	75	66	5	?	22
1878-80 ...	2	15	526	577	58	13	170	187	203	26	?	30

Small-pox, it will be seen, has been efficiently isolated, and its spread in the borough has, in consequence, on many occasions since 1874 been effectually prevented. In his annual report for 1877, Mr. Harris Butterfield, the borough medical officer of health, says: "The history of the various invasions of small-pox into the borough during the year affords a striking illustration of the advantage of being prepared beforehand with the means of isolation. Had it not been for the facilities offered by the Fever Hospital, and the promptness with which

Results of isolation, &c.

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Influence of  
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"the cases of small-pox were reported and removed, there can be no doubt that we should have had a serious epidemic of this disease." Again, in referring to the question of the early isolation of cases of this disease in his report for the year 1879, Mr. Butterfield writes: "In 1874 a case being unreported was undiscovered until the registrar's return announced its death. In less than two months 115 cases were known and 26 deaths had occurred. It was six months before the epidemic was stamped out at a cost to the ratepayers of 1,400*l*. . . . Since then small-pox has been frequently imported, but fortunately it has also been immediately made known and promptly dealt with." But the number of patients removed to hospital suffering from other infectious diseases bears but a small proportion to the total cases indicated by the deaths registered. This is especially noteworthy as regards scarlet fever, in preventing the diffusion of which, measures of isolation are so pre-eminently necessary; thus out of a total of attacks, numbering in all probability some 5,000, which occurred during the three years 1878-80, only 544 were removed to the hospital. Cases of this disease are unfortunately but rarely reported to the Sanitary Authority; the medical officer of health being dependent for information as to the localities in which it is prevalent, to "the mortality returns, the admissions to the Fever Hospital, the school board officers, . . . a few of the medical practitioners, and to occasional anonymous communications."\* I am, however, informed that the hospital has been of "inestimable service" in preventing the spread of infection in the several houses from which patients have been removed, and that where the removal has been effected at an early stage, and has been followed up by measures of disinfection, such as are carried out at the public cost by the Health Department of the Corporation, it has in a very large proportion of cases been effectual in staying any further spread, and in enabling the occupants of the infected houses to resume their trade or other calling without risk to the public health.

Use of the  
Hospital by  
other Sanitary  
Authorities.

Patients have also, since 1874, been received into the Bradford Fever Hospital from some 25 other sanitary districts, urban and rural. Some of the authorities of these districts have, however, only made use of the hospital for the isolation of occasional cases of small-pox, and, as regards several districts concerned, the total number of cases of all diseases sent in from them during the past seven years has fallen short of half-a-dozen. According to a return, however, which was made to the Local Government Board in 1879, several urban sanitary authorities made special reference to the Bradford Fever Hospital as being available for the reception and isolation of cases of infectious diseases occurring in their districts, on payment by them of 3*s*. 6*d*. a day for each patient, together with expenses of removal, and I have hence prepared the subjoined Table showing the extent to which the hospital has been used for the purposes referred to by these authorities during the three years 1878-80. The total number of cases admitted from the several districts are recorded, whether they were sent in by the sanitary authorities or by private arrangement, and a glance at the Table will suffice to show that, as regards the majority of the districts in question, the reference to the hospital which has been made in the return adverted to has little or no meaning. Indeed, so far as sanitary districts, which are more than 3½ miles distant from the hospital, are concerned, the only public use which has been made of the means of isolation available, consisted in the isolation of one small-pox patient at the expense of the Calverley urban authority, the two other patients received from that district being "private" patients, and the single patient admitted from the Allerton urban district being a "free" patient.

\* Annual Report of the Medical Officer of Health for 1879



Urban Sanitary Districts.	Date when arrangement came into Operation.	Population in 1871.	Population (estimated in 1880).	Deaths registered				Admissions to Bradford Fever Hospital.	Approximate Distance of District from the Hospital.
				From under-mentioned Diseases, in the 3 Years 1878-80.					
					1878.	1879.	1880.		
Allerton ..	1874	2,906	3,600	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 0 1	{ 0 5 0	{ 0 1 0	{ 3 miles. }
Birkenshaw ..	1870	2,833	2,700	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 3 0	{ 0 17 0	{ 0 0 0	{ 3½ miles. }
Birstal ..	1870	6,044	6,800	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 16 4	{ 0 5 6	{ 0 0 0	{ 5½ miles. }
Calverley ..	1872	3,195	3,700	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 1 2	{ 0 4 0	{ 1 1 1	{ 5½ miles. }
Farsley ..	?	3,829	4,400	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 8 2	{ 0 4 0	{ 0 0 0	{ 2½ miles. }
North Bierley ..	1874	18,616	20,000	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 33 1	{ 0 16 2	{ 0 0 1	{ 3½ miles. }
Pudsey ..	1872	13,977	15,200	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 28 8	{ 0 32 5	{ 0 12 11	{ 1 to 4½ miles; most populous parts 3½ miles. }
Shelf ..	1875	3,091	2,700	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 4 1	{ 0 1 0	{ 0 0 0	{ 3 miles. }
Tong ..	1870	4,229	5,600	{ Small-pox .. Scarlet-fever .. "Fever" ..	{ .. .. ..	{ 0 3 3	{ 0 6 2	{ 0 0 1	{ 1½ to 6 miles; most populous part, 2½ miles. }

APP No. 1.  
—  
On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

APP. NO. 1.  
On the Use and  
Influence of  
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Infectious  
Diseases, by  
Dr. Thorne.

Payment for  
patients.

The number of patients who have been admitted from all sources free of any charge, and the number paid for, either privately or by the several sanitary and poor-law authorities in the neighbourhood of Bradford, is shown in the next table:—

Sources of Payment.	1878.	1879.	1880.
Admitted free of charge ... ..	122	121	200
Patients or their friends ... ..	31	21	57
Bradford Urban Authority ... ..	63	35	67
Calverley " " ... ..	1	0	0
Clayton " " ... ..	1	0	0
Idle " " ... ..	1	1	0
North Bierley Urban Authority ... ..	1	0	0
Pudsey Urban Authority ... ..	10	11	2
Bradford guardians ... ..	0	20	26
North Bierley guardians ... ..	7	4	7
Wharfedale guardians ... ..	0	1	2
	237	214	361

Public Health  
Act, 1875, s. 132.

As regards those patients sent in and paid for by the Urban Sanitary Authority of Bradford no measures have been taken with a view of recovering the cost incurred. The ordinary charge made per patient is 3s. 6d. per day, and, as regards the borough, only 2s. 6d. a day for children under 12 years of age. In making these charges, however, the committee of management have desired to hold in view the fact that the hospital is to a certain extent a charitable institution, and they have not charged the total cost incurred, such cost having been calculated to amount to 5s. 1d. a day, including establishment charges, but not interest on the original outlay in constructing the hospital.

Public Health  
Act, 1875, s. 124,  
&c.

In a few instances only has any action been taken to secure the compulsory removal of patients to the hospital under section 124 of the Public Health Act, 1875, the difficulty to be contended with being often, I am informed, not so much an absence of such "proper" accommodation as is deemed necessary to justify resort to legal proceedings, but that where such measures of isolation as can often be carried out in a private house are available, the patient, instead of being kept apart, is placed in a room occupied by others. When, however, "the want of accommodation is such as to bring the case within the scope of section 124 of the Public Health Act, removal is enforced."\* With a view to this the order of a magistrate has, since 1872, been procured on "eight or nine" occasions when opposition was anticipated. Once only has any resistance been made to the order, and in this case the parent of the patient was fined before the removal to hospital was secured. Proceedings have also occasionally been taken against parents under section 126 for exposing children suffering from scarlet fever, and orders have been obtained to secure the immediate burial of the dead in certain instances, as, for example, where it was known that a "wake" was about to be held.

Admission of  
young  
children.

Examination of the hospital books for the three years 1878-80, shows that a large proportion of the patients admitted have been young

\* Annual Report of the Medical Officer of Health for 1879.



children, the number of patients of 10 years of age and under amounting to 485, or 59 per cent. of the 812 admissions at all ages :—

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—						1878.	1879.	1880.
Under one year of age	...	...	...	...	...	1	0	0
One year	...	...	...	...	...	3	4	4
Two years	...	...	...	...	...	10	13	22
Three years	...	...	...	...	...	19	14	26
Four years	...	...	...	...	...	15	15	37
Five years	...	...	...	...	...	18	20	23
Six years	...	...	...	...	...	22	21	30
Seven years	...	...	...	...	...	15	17	24
Eight years	...	...	...	...	...	11	10	9
Nine years	...	...	...	...	...	17	12	22
Ten years	...	...	...	...	...	9	6	16
						140	132	213
Above ten years	...	...	...	...	...	97	82	148
Totals						237	214	361

I am also informed by Mr. Rix, whose experience dates from the opening of the hospital in 1872, that parents now consent much more readily than they formerly did to the isolation of their children in hospital. When, however, a mother refuses to part with her child, she is admitted together with it, at the same rate of payment as is made for an adult patient, rather than that isolation should not be carried out, but in no instance has her stay exceeded three days, although it has been obvious from the clothing, &c. brought in, that the original intention was to stay throughout the whole period of the child's illness. When parents leave the hospital all their clothing, &c. is first dealt with in the disinfecting stove. The greatest difficulty which Mr. Rix meets with is to secure the removal of children back to their homes when they are convalescent, and he has often been obliged, after writing repeatedly and without effect, requesting parents to take their children out, to send the patients home in charge of a nurse. To some extent this reluctance on the part of parents to remove their children from hospital, may be due to diminished wages consequent on depression of trade, but it is certainly on the increase.

During the year 1879, which may be taken as a typical year, the social status of the patients was as follows :—

Mill-hands and labouring classes	-	-	-	-	167
Domestic servants	-	-	-	-	20
Professional class, merchants, &c.	-	-	-	-	11
Tradespeople	-	-	-	-	9
Paupers	-	-	-	-	5
Nurse	-	-	-	-	1
Pupil	-	-	-	-	1
					214

Visitors are in all cases allowed to make inquiry concerning patients twice a week, and more frequently, provided special permission is given on a card issued for the purpose; they are also, in certain cases, allowed to see patients in the enteric-fever wards. Admission to the small-pox and the scarlet-fever wards is, however, strictly prohibited unless there

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is danger to a patient's life, and even then it is restricted as much as possible. The advent of symptoms likely to terminate in death is, however, always notified to the patient's friends, who are made acquainted with the regulations as to visiting which are appended to this Report.

The medical staff of the Bradford Fever Hospital consists of two honorary physicians, Dr. W. Alexander and Dr. E. T. Tibbits, of an honorary consulting surgeon, and of Mr. Rix, the Resident Medical Superintendent. With a view, however, of facilitating the isolation of persons suffering from infectious diseases, it is generally understood that patients can, in consultation with the medical staff of the hospital, be visited by medical practitioners of their own choice, a privilege which is but rarely resorted to.

Disinfecting  
stoves.

One of the "Nottingham self-regulating" stoves, as designed by Dr. W. H. Ransom, F.R.S., is in use at the hospital, it having somewhat recently been erected in the place of one of Messrs. Fraser's disinfecting stoves, which was formerly in use. It is erected in a stove-house which is situated in the hospital grounds, and which in every essential respect resembles the one at Nottingham; it is, however, constructed of stone, and is throughout lined with white tiles.

The Corporation of Bradford also possess a disinfecting stove. Until September 1879, the one in use by the sanitary authority was Messrs. Fraser's stove, at the Fever Hospital. I am, however, informed by the Medical Officer of Health that owing to the difficulty experienced in maintaining throughout all parts of the chamber an equable temperature, to the occasional scorching, and the constant supervision necessary in order to prevent the damaging, of the articles within, coupled with the fear that in order to avoid risk of scorching, the articles stoved were not submitted to a sufficiently high temperature, the use of this apparatus was abandoned, and at the date named a separate "Nottingham self-regulating" stove was procured for the purposes of the Corporation.

It is placed in a stove-house which has been erected in a yard resembling that which forms the "Disinfecting Station" at Nottingham. In the yard are two vans, one for infected articles, and one for purified articles, each having a distinctive mark. Several thousand articles, including beds, pillows, blankets, carpets, and clothing, have been dealt in it since it was erected; the interior of the stove is always heated to a temperature of 250° Fahr., and with a view of saving labour and the expense of an attendant, the articles are often placed into it at night and left there till the morning. In no instance has anything been scorched or otherwise damaged. The disinfection is carried out free of cost to the poor and the wage-earning classes, but persons who are able to pay are charged according to a definite scale. Thus, during the year 1880 some 30*l.* were received for the stoving of articles belonging to the well-to-do-classes.

Influence of  
hospital on  
surrounding  
neighbour-  
hood.

The situation of the hospital is an isolated one, there being hardly any dwellings in its vicinity, and of these the nearest stands some 250 feet from any of the hospital buildings. The only instances in which any spread of infection has been referred to the hospital were in the cases, (1°) of a non-resident female scrubber who is believed to have conveyed small-pox to her home, and (2°) of a person who contracted the same disease after communicating with a convalescent patient over the hospital wall; some articles being at the same time handed to and fro. The disease was, however, at the time, prevalent in the town, and there were hence other possible sources of infection. In no case has it been suggested that the ambulances, belonging either to the hospital or the Sanitary Authorities, have been the means of spreading infection.



## BRADFORD FEVER HOSPITAL.

*To the Friends of Patients.*

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On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.Rules as to  
visiting  
patients.

Your attention is requested to the following rules, which will be strictly carried out :—

I. - The days on which inquiry may be made respecting patients are on *Wednesdays and Saturdays*.

II.—On account of the danger from infection in scarlatina and small-pox, patients suffering from these diseases must not be visited by their friends.

III.—In case of danger to a patient's life, notice will be given to the friends, and if they wish to visit the patient, they must conform to the directions of the Medical Superintendent.

IV.—As patients are provided with all things necessary for their treatment, no articles of diet, fruit, sweets, &c. must be brought by their friends.

Children should not be brought as visitors.

Patients of the hospital holding personal communications with their friends without permission from the Medical Superintendent, will be prosecuted under "The Public Health Act, 1875."

## BROADSTAIRS URBAN SANITARY DISTRICT.

Population in 1881, 4,362. Rateable value, 25,500*l*.

## ISLE OF THANET RURAL SANITARY DISTRICT.

Estimated population in 1881, 7,780. Rateable value, 69,595*l*.

## MARGATE URBAN SANITARY DISTRICT.

Population in 1881, 15,889. Rateable value, 73,000*l*.

## RAMSGATE URBAN SANITARY DISTRICT.

Population in 1881, 22,605. Rateable value, 100,800*l*.

About five years ago the Ramsgate and Margate urban authorities, and the Isle of Thanet rural authority within whose district Broadstairs was at that date situated, had agreed to combine for the purposes of erecting a hospital for infectious diseases for their respective districts, which included the entire area of the Isle of Thanet, in all some 30,000 acres. A site had already been purchased, and the question of the buildings was under consideration, when, towards the end of 1876, an outbreak of small-pox occurred in the village of St. Peters, then within the rural district, rendered it necessary at once to take possession of some premises in the village and of using them for the purposes of a hospital. It was also deemed advisable in January 1877, no longer to delay the erection of some building on the hospital site, and hence a temporary wooden pavilion containing two wards, and also an administrative block, were put up. These buildings, somewhat altered since they were first constructed, together with certain additional ones, form the existing hospital. Since 1877, Broadstairs, including the village of St. Peters, has been constituted an urban district, and the hospital therefore now answers the purpose of three urban and one rural sanitary district.

Origin of the  
hospital.

The site on which the hospital stands comprises two acres of chalk land, at an elevation of about 160 feet above Ordnance datum, and is situated in a sparsely populated portion of the hamlet of Northwood, within the Isle of Thanet rural district. It is situated about 1½ miles from Ramsgate, 2½ miles from Broadstairs, 3 miles from Margate, and about 5 miles from Minster, the latter being the most populous place

Site and soil.

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Hospital  
buildings.

within the rural district. The ground adjoins the main road leading from Ramsgate to Margate, and it is enclosed by a substantial flint and brick wall varying from  $4\frac{1}{2}$  to 6 feet in height.

The hospital buildings consisting of 1<sup>o</sup>, a ward-pavilion; 2<sup>o</sup>, an administrative block; 3<sup>o</sup>, an outbuilding containing a laundry, a disinfecting stove, a coal-house, and an earth-closet; 4<sup>o</sup>, an ambulance shed; and 5<sup>o</sup>, a mortuary.

The ward-pavilion, which stands on brick piers, is constructed of two layers of wood about 6 inches apart, the outer one being feather-edged weather boarding, the inner one polished deal planks, tongued and grooved. It has a slate roof, lined with polished deal; and between it and the administrative block is a covered passage open at the sides. Originally this pavilion contained two wards, separated in the middle by a nurse's room, an entrance lobby, a bath room, and a store room. Each ward then contained somewhat under 20,000 cubic feet and a floor-space of 1,270 square feet, and the building was thus adapted to receive 20 cases of one infectious disease, occurring in both sexes. Since its erection, however, each ward has been divided into three separate rooms. Two of these have windows on both sides, affording means of cross ventilation, but the third is a mere passage-room and has windows on one side only. This latter room was originally intended to afford additional sleeping accommodation for nurses, but it is now used for patients also. The number of beds has also been increased, as many as 28 being in use at the date of my visit. In addition to the means of ventilation afforded by double-hung sash windows, the wards have louvred openings in the roof. They are also provided with open fire-places, but I am informed that owing to the character of the building it is most difficult, even with a very large consumption of fuel, to keep the wards reasonably warm in cold weather. The wards are clean, cheerful, well kept, and comfortably furnished. At each end of the building, and separated from the wards by means of a cross-ventilated lobby, is a self-acting earth-closet and a slop sink, both being properly ventilated. The administrative block is constructed very similarly to the ward-pavilion; it contains a kitchen, scullery, pantry, &c., and a bedroom for two servants.

Ventilating  
and warming.

Disinfecting  
apparatus.

The disinfecting stove is that known as Fraser's movable disinfecting apparatus, but since it was procured it has been fixed in a brick building. Some portions of the iron plates of which it is composed are however exposed, and it is admitted that it does not answer its intended purposes except at the risk of scorching articles. Indeed, the sanitary authorities have already been obliged to make good clothing and other articles which have been damaged. Sulphur is burned in the apparatus whenever it is used.

Ambulance.

The ambulance consists of a neat polished wood conveyance resembling a private omnibus, which has been specially constructed for the hospital purposes. It is, however, not fitted with a movable stretcher, and there is no window by means of which an attendant on the box-seat can keep the patient in view.

Water-supply  
and drainage.

The premises are throughout provided with a constant service of water from the Ramsgate mains, and they are drained into a cesspool in the chalk.

Admission  
of patients.

Since this hospital was opened, in March 1877, considerable use has been made of it for the isolation of cases of infectious diseases, as will be seen from the subjoined table, which specifies the number of cases of certain diseases which came under treatment in the four years, 1877-80.



Disease.	1877.	1878.	1879.	1880.
Small-pox ... ..	3	23	8	1
Scarlet fever ... ..	19	30	45	103
Fever ... ..	11	16	2	11
Diphtheria ... ..	—	—	2	—
Other diseases ... ..	—	3	2	3
Totals ... ..	33	72	59	118

In 1880 the hospital was largely used. Thus when I visited it early in August of that year, I found that during the preceding seven months 79 patients had been admitted. One patient had had small-pox, 65 scarlet-fever, 10 enteric fever, and three had suffered from other diseases. Twenty-five scarlet-fever patients, three of whom were accompanied by their mothers, were under treatment at the date of my visit. The persons isolated were found to have come from all the four sanitary districts. Thus out of a total of 177 patients received in the two years 1879-80, 93 had come from the Ramsgate urban district, 58 from the Margate urban district, 19 from the Broadstairs urban district, and 7 from the Isle of Thanet rural district.

Excepting paupers, who are not admitted, the patients had been derived from nearly all classes of life, including the families of gentlemen, merchants, tradesmen, mechanics, labourers, &c. Many were received from houses where they would have been specially likely to spread infection, such as schools, public institutions, shops, and dress-making establishments, laundries, &c.; and several were visitors removed from lodging-houses. In a very large proportion of cases too, it is known that the patients isolated were the first persons attacked in the families from which they were removed, and that their removal prevented any further spread of disease.

Of the 177 patients admitted during the two years 1879-80, 109, or 61 per cent., have varied in age from 4 months to 10 years, the actual ages being as under:—

Age.	No. of Patients.
Under 1 year ... ..	2
1 year ... ..	1
2 years ... ..	12
3 " ... ..	14
4 " ... ..	13
5 " ... ..	7
6 " ... ..	18
7 " ... ..	14
8 " ... ..	13
9 " ... ..	6
10 " ... ..	9
	109
Over 10 years ... ..	68
Total ... ..	177

The large number of children received into the hospital is worthy of notice in view of the difficulties elsewhere alleged to exist in securing

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their isolation. To some extent the success obtained in this regard is due to the admission of mothers with sick children of tender years; thus, as already stated, three mothers were in hospital at the time of my visit, and they were acting in the capacity of nurses under the direction of the matron. The general cheerfulness of the hospital wards and grounds, and the means of recreation, including swings and toys in the wards where the convalescents were placed, have given to the hospital some of that reputation so often attaching to children's hospitals, and it is believed that the objection amongst parents to part with their sick children is in consequence being gradually overcome.

Spread of  
disease  
amongst  
patients, owing  
to imperfect  
separation of  
different  
diseases.

The alteration in the construction of the wards, which has already been adverted to, has been unfortunate, for it has led to the reception into the building, at the same time, of patients suffering from two different infectious diseases, and the result of this step has, as should have been foreseen, led to convalescents contracting a second disease in the building. Some half-dozen scarlet-fever patients have in this way contracted small-pox, and at least one enteric-fever patient has contracted scarlet-fever.

In April 1877, prior to the alterations, I had occasion, under circumstances yet to be referred to, to inspect this hospital, and as the result of my visit the Local Government Board drew the attention of the sanitary authorities to whom it belonged to the circumstance that the provision afforded "would appear to be limited to accommodation for cases of one disease occurring in persons of both sexes;" they added that they did not consider that this would "be found sufficient for a population which in 1871 amounted to 42,129;" and they added that "the subject of increasing the accommodation should receive early consideration."

On the occasion of my visit in August 1880 I further ascertained that owing to the want of accommodation in the hospital some cases of scarlet-fever had been removed, by a medical practitioner, to a cottage close by, and that a case of small-pox which had arisen could not be provided with means of isolation. Under these circumstances I advised the committee to whom the management of the hospital is deputed no longer to delay the provision of further accommodation, and to limit the use of the existing ward-pavilion to one disease. [Plans for the erection of two permanent ward-pavilions have since then been prepared.]

Section 124,  
Public Health  
Act, 1875.

No action has been found necessary under section 124 of the Public Health Act, 1875, with a view of compelling removal to the hospital, but in one instance such action was threatened and a medical certificate was procured with a view to this. The friends of the patient being informed of the steps which were impending then consented to his removal.

Section 132,  
Public Health  
Act, 1875.

A charge of 21s. per week, which is deemed to cover the actual cost of maintenance and treatment, is made for each patient, but it is well known that the charge is not enforced unless the patients or their friends are well able to pay it, and it is hence believed that the question of payment has not prevented the isolation of any whose dwellings were such as to call for it. In one instance an effort was made to recover a sum of 3l. 15s. from a tradesman for the maintenance and treatment of his son who had been in the hospital three weeks and six days, but as the proceedings under section 132 of the Public Health Act, 1875, were not taken within six months after the patient's discharge, they failed.

General and  
medical ad-  
ministration.

The control of the hospital is in the hands of a committee, consisting of 16 members, five of whom are selected both by the Ramsgate and the



Margate urban authorities, and three both by the Broadstairs urban and the Isle of Thanet rural authorities; the town clerk of Margate acting as clerk. The powers and duties of this committee are embodied in an agreement drawn up and signed by the several sanitary authorities concerned, but it has been found that this method of forming a hospital authority has not worked satisfactorily. The action of the committee has been hindered, amongst other reasons, by the circumstance that it cannot enter into contracts, or hold lands, and that it cannot sue or be sued; and it is hence felt that a corporate body such as a joint board formed under a Provisional Order would constitute a much more efficient governing body. The medical supervision of the hospital and the medical attendance on the patients is vested in Dr. E. A. White, of Margate, who receives for this an annual sum of 150*l.* Any patients can, however, at their own cost, be attended by a medical practitioner of their own choice, a privilege which is occasionally resorted to. The permanent medical staff consists of a matron, who receives 50*l.* a year together with board, of one nurse, a cook, and a porter.

Visitors are allowed to enter the hospital grounds, and to see their relatives or friends through the ward windows once a week; but there are reasons for believing that, in one instance at least, this practice led to personal communication between the sick and a visitor, and that scarlet-fever was in consequence spread. Visitors.

The site on which the hospital stands cost 429*l.* 14*s.* 9*d.*, and the wooden ward-pavilion together with the movable disinfecting stove cost 634*l.* 6*s.* 6*d.*, making an original expenditure of 1,064*l.* 1*s.* 3*d.* Additional constructions, including the wash-house, disinfecting house, enclosure walls, &c., cost an additional 1,368*l.* 13*s.*; the furniture and fittings amounted to 223*l.* 2*s.* 4*d.*, and the architect's commission to 15*l.*; the total cost thus being 2,670*l.* 16*s.* 7*d.* Cost of construction, &c.

The cost of maintaining this hospital during the year ending March 1880 was 619*l.* 9*s.* 11*d.*, and it was divided between the three authorities to whom it then belonged as follows:—Margate paid 193*l.* 6*s.* 7*d.*, Ramsgate 243*l.* 16*s.* 4*d.*, and the rural authority of the Isle of Thanet 182*l.* 7*s.* A sum of 15*l.* 17*s.* 3*d.* was, during the same period, repaid on behalf of patients. During the year ending March 1881, the total expenditure for maintenance, &c. was 924*l.* 11*s.* 9*d.*, and it was divided between the four contributing authorities as follows:—Broadstairs paid 99*l.* 0*s.* 6*d.*, Margate 312*l.* 4*s.* 1*d.*, Ramsgate 414*l.* 8*s.* 1*d.*, and the rural authority 98*l.* 19*s.* 1*d.* A sum amounting to 56*l.* 0*s.* 2*d.* was, during the same period, repaid by, or on behalf of, patients. Originally the rateable value of the several districts formed the basis of assessment, but it was found that under this plan the rural district, which is only sparsely populated, paid an undue amount, and hence for some time past the payments have been determined by the population of the districts. Cost of maintenance.

In March 1877, soon after the hospital was completed, a memorial was presented to the Local Government Board urging that the hospital should be removed from its present site. The main grounds on which this application was based were, that the occupation of a large number of laundresses in Northwood had already been interfered with, and would ultimately be destroyed; that the increase of building in the hamlet, which practically formed a country suburb of Ramsgate, would be arrested, and that by means of the milk and other food supplies derived from Northwood, danger of the transmission of infection would result to Ramsgate. Influence of the hospital on the surrounding neighbourhood.

As the result of this memorial, an inquiry was made by the Local Government Board, and it was ascertained that, with the exception of

three cottages, which were situated outside the hospital grounds, and which were some 120 feet from the nearest hospital building, there was no other dwelling-house nearer than 270 feet from the hospital. The three cottages referred to were, however, then in temporary use for the reception of cases of infectious disease. Under these circumstances, the combined sanitary authorities were advised to enclose the hospital by means of a wall, and to discontinue the practice of receiving patients into any cottages in the hamlet.

Since 1877 the hospital has, as already described, been enclosed; but owing to the insufficient accommodation in the hospital, private patients from Ramsgate have been placed by medical practitioners in at least one of the three cottages nearest to the hospital. The hamlet has, however, since that date become more populous; building operations have increased in the immediate vicinity of the hospital site, and, as the result of inquiry in all available directions, I have not been able to learn that any one of the results anticipated by the memorialists has been brought about.

#### CARLISLE URBAN SANITARY DISTRICT.

Population in 1881, 35,866.

#### CARLISLE RURAL SANITARY DISTRICT.

Population in 1871, 15,579.

#### Site and soil.

A hospital for infectious diseases was established in Carlisle by public subscription in 1820, and in 1847 it was moved to the existing premises, namely, a two-storied private residence standing on a site which covers about  $6\frac{1}{2}$  acres. The hospital which is known as "Crozier Lodge," occupies the summit of a gentle elevation of sandstone rock, and, though within the borough limits, is in a well isolated position just outside, and to the west of the town. Ever since it was established the hospital has been available for the reception of cases of infectious diseases occurring within the borough, and in 1832, 1848, and 1853, it was used for the isolation of cases of asiatic cholera, the disease being on each occasion prevented from spreading. But in 1872, small-pox became epidemic and this led to the use of the hospital by the Sanitary Authority, who then entered into an agreement with the Hospital Committee, which resulted in the erection by the Town Council of two detached wards, for five beds each, behind the then existing building. These wards on completion became the property of the Committee on condition that 10 beds, in some part of the hospital, should at all times be reserved for the purposes of the Sanitary Authority, and that additional accommodation being available, non-pauper cases sent in by the Sanitary Authority should at any time be received. The Sanitary Authority further undertook to pay a sum of 1*l.* 11*s.* 6*d.*, for the maintenance of every patient they sent in who was 12 years of age or over, and half that sum for those below that age; in addition to a fee for medical services, and the costs attendant on removal. They also agreed permanently to maintain in proper repair the two wards erected by them out of the borough rates.

#### Use of hospital by Sanitary Authority.

In 1874, however, typhus fever became widely epidemic in and around Carlisle, and the number of patients needing isolation became so numerous that the funds at the disposal of the Committee, and also the ordinary staff of the hospital, were found to be quite insufficient to deal with the demands made upon them. In view of this emergency a conference was, on the 13th of November 1874, held between certain members of the Carlisle Urban and Rural Sanitary Authorities, and of



the Hospital Committee, at which it was determined provisionally to hand over Crozier Lodge and its entire arrangement to the two above-named Sanitary Authorities. A resolution was also passed to the effect that it was desirable that the hospital should be permanently transferred to those Authorities. This latter resolution was, however, not carried into effect, and on the termination of the epidemic, matters reverted to the state they were in before 1874.

The principal building of the hospital premises as they now stand is the private residence, purchased in 1847. The ground-floor is reserved for the matron and the various administrative offices. The upper floor is divided from side to side into two halves by a passage, having ample means of ventilation by windows at either end. Opening into this passage on both sides are the rooms which serve the purposes of wards. Of these there are six, containing from 2,560 cubic feet, to 1,150 cubic feet each. In some instances the cubic space per bed is as low as 575 feet; this is, however, stated to apply only to rooms occupied either by children, or by one sick child, accompanied by a parent acting as nurse. A nurse's bed room and two waterclosets also open into this passage, the latter being thus in direct communication with the interior of the building. The two wards erected by the Urban Sanitary Authority are both quite detached blocks, which are reached from the main building by covered passages having open louvred sides; they also have separate grounds for recreation purposes, and separate accommodation for nurses. They each contain six beds, and have a superficial area of 610 square feet, and a cubic capacity of some 8,500 feet. The waterclosets are separated from the wards by an imperfectly ventilated lobby.

There is also a third detached building containing two well-lighted and well-ventilated wards which are usually reserved for small-pox patients. One contains two beds, and has a superficial area of 252 square feet, and a capacity of 3,025 cubic feet; the other has three beds, with a superficial area of 396 square feet, and a capacity of 4,750 cubic feet. In all 31 beds are available for the reception of patients. The cooking for all the wards is done in the main building, from which all parts of the premises are administered.

With the exception of small-pox, typhus, and diphtheria, which are always treated in the detached blocks, it is not customary, unless the hospital is very full, to limit the use of the principal building to one disease: typhoid fever, scarlet fever, and measles, being under ordinary circumstances treated in it at one and the same time, although in different rooms, and as far apart as possible. In the four years during which the present matron has been in office, disease has in no case spread from one ward to the other.

In a detached building is a brougham which has been stripped of its linings and is used as an ambulance. No disinfecting apparatus is provided; but the chaff beds used at the hospital are burned when necessary, and in the town infected articles are either burned by the Sanitary Authority under the powers given in section 121 of the Public Health Act, 1875, or submitted to the fumes from a mixture of saltpetre and sulphuric acid. The premises are supplied with water from the town waterworks, and also from a deep well in the grounds. The drains communicate with the town sewer; some of the connexions being in certain respects faulty.

Ambulance.

Water supply and drainage.

At the date of my visit, nine patients were under treatment: namely, eight suffering from scarlet fever, and one from enteric fever. All were in the main building.

The number of patients admitted during the five years ending 1879, and the diseases under which they have suffered, have been as follows:—

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Total admis-  
sions to  
hospital.

Date.	Typhus Fever.	Enteric Fever.	Small- pox.	Scarlet Fever.	Diph- theria.	Measles.	Other Diseases.	Total.
1875 ... ..	40	30	1	6	1	2	—	80
1876 ... ..	2	19	2	3	—	1	—	27
1877 ... ..	1	16	3	4	—	2	4	30
1878 ... ..	—	22	—	20	3	2	—	47
1879 ... ..	7	12	—	4	—	1	5	29
1875-79 ...	50	99	6	37	4	8	9	213

These cases, however, include patients sent in by subscribers to the Institution; 2nd, patients occupying two “free beds” which are separately endowed; 3rd, patients who pay for their own maintenance at the rate of 8s. 9d., or 5s. 3d. a week, according to their age, or a sum of 10s. 6d. a week if a private room is used; 4th, patients sent in by the Urban Sanitary Authority; 5th, patients sent in by the Rural Sanitary Authority; and 6th, paupers from within the borough, sent in at the cost of the Guardians.

The cases admitted during the three years 1877-79, were received from the under-named sources:—

Date.	Sent in by the Urban Sanitary Authority.	Sent in by the Rural Sanitary Authority.	Sent in by the Guar- dians of the Carlisle Union.	Private Patients and others.	Total Number admitted from all Sources.
1877 ... ..	9	1	3	17	30
1878 ... ..	30	7	3	7	47
1879 ... ..	10	1	10	8	29
1877-79 ...	49	9	16	32	106

With regard to the use of the hospital for the purposes of the borough, it should be stated that the Medical Officer of Health, Dr. Robert Elliot, has authority to send in any persons, at the expense of the Town Council, if in his opinion they require isolation, and are unable to pay the usual hospital fees. The “free beds,” when unoccupied, have also at times been used for the same class of patients. In some instances the patients so sent in have, in the opinion of the Sanitary Authority, been capable of making some payment towards their maintenance whilst in hospital, and a request for re-payment, either in part or in whole, has been made upon them. These patients have, however, almost invariably come from the working classes, and, as a matter of fact, the payment has never been enforced.

Admission of  
young  
children.

When visiting the hospital I noted the circumstance that all the nine patients under treatment were children some of them being very young, one indeed being only 13 months old, and I learnt that a very large proportion of the patients were, as a rule, children, and that the difficulties which elsewhere are stated entirely to prevent the removal of young children to infectious hospitals have within recent years been to an



important extent overcome in Carlisle. According to Dr. Elliot, this result has mainly been attained owing to the two following circumstances:

In the first instance, when scarlet fever was somewhat prevalent in the borough in 1878, Dr. Elliot issued to the teachers of the most frequented schools books of blank forms, with a request that if the absence of any child was believed to be due to infectious disease, the form should be filled up with the name and address of the child, together with a statement as to the supposed disease, and then be transmitted to him. The result of this step, in which the school authorities willingly co-operated, has been that in a large number of cases early information as to the existence of infectious disease has been obtained, and it has been utilised by securing not only the immediate removal, in many instances, of the patient to the hospital, but also such partial isolation as can at times be afforded in private dwellings; the enforced absence from school of children from infected houses; together with the cleansing and disinfecting of the infected premises.

Secondly, as regards the very young children, it is the custom of the hospital authorities always to admit a parent, a relative, or a nurse, together with the patient if desired, provided a payment of 10s. 6d. per week, inclusive of laundry expenses, &c. is made for such person. Many avail themselves of this privilege, especially those from amongst the better classes, and I found that in the four months preceding my visit four children had thus been accompanied whilst in hospital. These patients are always placed in private rooms. This arrangement is thus not applicable to the lower classes.

The Hospital Committee provide medical attendance; a non-resident officer, who is also the visiting medical officer to the Carlisle Dispensary, and not in private practice, receiving from them an annual salary for his services. In addition to this salary he also receives 17. 1s. for each case sent in by the Urban or Rural or Poor-law Authorities, this fee being charged to these authorities. Patients can, however, be attended at their own cost by a medical practitioner of their own choice.

In a few instances the Urban Sanitary Authority have found it necessary to secure the compulsory removal of patients to the hospital under a magistrate's order. Several refusals to comply with the Medical Officer of Health's proposal for removal having been met with in 1874, an order was in a certain case procured and the removal effected. It then became known that the Authority could, if they wished, enforce isolation at the hospital, and all further resistance was for some time at an end. In April 1880, another order was obtained in the case of some children suffering from scarlet fever, who occupied a somewhat overcrowded bed-room also used by other members of the same family. I am informed by Dr. Elliot, himself a magistrate, that the principal ground on which the order in this case was granted, was the fact that the patients lived in a house close to a school attended by some 300 children, and that the removal was necessary in order to prevent the spread of infection to others.

In the year ending March 1879, a fairly representative year, the expenses incurred by the Urban Sanitary Authority in connexion with the hospital were as follows:—

APP. NO. 1.  
On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.  
Notification of infectious diseases by school teachers.

Admission of patients, &c.

Section 124, Public Health Act, 1875.

Expenses incurred by Urban Sanitary Authority.

	£	s.	d.
Maintenance of patients, medical attendance, &c. -	-	79	10 9
Ambulance expenses - - - - -	-	9	7 0
Sundries - - - - -	-	4	4 3
		<hr/>	
	£93	2	0
		<hr/>	

## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Admissions  
from rural  
sanitary  
district.

With regard to the use of the hospital by the Rural Sanitary Authority, it is only necessary to note, 1st, that so far as the rural district is concerned the hospital occupies a fairly central position; 2nd, that the cases admitted from the Rural District during the three years 1877-79, bore the relation shown to the deaths from certain specified causes in that district indicated by the following table:

SMALL-POX.		SCARLET FEVER.		DIPHTHERIA.		"FEVER."	
Deaths.	Cases admitted into Hospital	Deaths.	Cases admitted into Hospital.	Deaths.	Cases admitted into Hospital.	Deaths.	Cases admitted into Hospital.
—	—	7	1	4	3	17	5

3rd, that the patients sent in by that Authority, and of whom three were children varying in age from two years to five years, in most cases resided at a considerable distance from the hospital, three being removed a distance of  $3\frac{1}{2}$  miles, five a distance of 4 miles, and one a distance of over six miles; 4th, that no measures have been taken under either sections 124 or 136 of the Public Health Act, 1875, for the removal of the patients, or for the recovery of expenses.

Isolation of  
paupers suffer-  
ing from  
infectious  
diseases.

The hospital, as already stated, has also been used by the Guardians of the Carlisle Union for the isolation of cases of infectious diseases occurring amongst paupers resident in the borough; the special wards at the workhouse not having been used for such cases since 1877. The number of paupers admitted has only been 16 in the three years ending 1879; they have as yet all been out-door paupers, and hence none have ever been sent in whilst wearing a distinctive dress. The clerk to the guardians, who is also a member of the Hospital Committee, informs me that the committee had never heard that any attempt to secure isolation amongst the non-pauper class had been hindered by the admission of paupers into the hospital. The matron, however, had heard of isolated cases in which some objection had been raised as to the risk of mingling with paupers; and she recorded a recent instance in which the wife of a professional man refused, on that ground, to come in with a child suffering from scarlet fever. Ultimately, however, and in consequence of a prolonged convalescence, the child and the mother did come in for a fortnight. The matron further informed me that whenever paying patients are in the hospital, paupers are always kept apart from them, and she was of opinion that any advantage attendant upon the exclusion of paupers would be only trivial in comparison with the great gain to the inhabitants of the borough, which is effected by securing the early isolation of infectious cases from amongst a class who, by reason of the nature of their habits and of their dwellings, are specially likely to become centres of infection. Dr. Elliot also holds the same opinion.

During the past 4 years the hospital was once empty for 6 weeks, and on three or four occasions it has been without patients for about 14 days.

Admission of  
visitors.

Near relations, if adults, are allowed to see patients twice a week; only one visitor being admitted on each occasion, and the duration of the visit being limited to five minutes. But few, however, avail themselves of this privilege, it being well known in the town that on the



occurrence of any serious symptoms the friends of patients are at once communicated with. APP. NO. 1.

It has already been stated that Crozier Lodge occupies an isolated position outside the town. There are some small streets within about 240 yards of the buildings, some of the houses occupying one side of the road, and the hospital grounds the other side. The premises of the Cumberland Infirmary adjoin those of the Infectious Hospital, the two buildings being 105 yards apart. In no instance has there been ground even for suspicion that infection has been communicated from Crozier Lodge either to the Infirmary, or to the houses above-named.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Influence of hospital on surrounding district.

The ambulance conveying patients from the town must of necessity pass through a poor and thickly inhabited district, but inquiry failed to elicit any information as to its being the means of spreading infection along its course.

### CHELTENHAM URBAN SANITARY DISTRICT.

Population in 1881, 43,972. Rateable value, 207,000*l*.

In 1870 the late Miss Delancey, on her death bed, expressed a desire to set apart a sum of 5,000*l*. for the purposes of a "Fever Hospital" for the town of Cheltenham and its neighbourhood, but the bequest was vitiated because it came between the operation of the statute of mortmain. Three out of four of the legatees under her will refused, however, to avail themselves of their legal rights, and they handed over their share of the bequest to a body of trustees nominated by the Board of the Cheltenham General Hospital, in order that it might be used for the purposes indicated by Miss Delancey, on the conditions that the hospital built should bear Miss Delancey's name, and that its erection should be at once commenced. The Reverend J. H. L. Gabell, of Cheltenham, contributed 1,000*l*. towards the purchase of a site, subscriptions to the amount of 3,500*l*. were raised by the inhabitants of the town, and Mr. Gabell from time to time added, for the purposes of the buildings and furniture, donations amounting, in addition to the first sum of 1,000*l*. to 5,365*l*.

Origin of the hospital.

The trustees appointed under the deed of endowment having considered the requirements of Cheltenham, with reference to the isolation of infectious diseases, and having had regard to the circumstances, 1<sup>o</sup> that the town was a health resort, 2<sup>o</sup> that it contained, owing to its collegiate establishments, a large number of persons at the time of life at which several of the infectious fevers are most prevalent, and 3<sup>o</sup> that owing to the social circumstances of the population, superior and separate accommodation would be necessary for patients belonging to the well-to-do classes who form an important proportion of the total population, determined to erect, (a) a detached small-pox pavilion, containing fourteen beds, inclusive of two in separate rooms, (b) a detached scarlet-fever pavilion for forty-two beds, inclusive of eight in separate rooms, and ten in convalescent rooms, (c) a detached enteric-fever pavilion containing ten beds, two of which were to be in separate rooms, (d) a small detached pavilion for two beds, to act as "separation wards" for occasional cases of typhus, &c., (e) a detached administrative building, and (f) out-buildings consisting of laundry, ambulance shed, disinfecting apparatus, mortuary, &c. At the present date, however, only two of the pavilions, namely, one for small-pox and one for scarlet-fever, together with certain administrative buildings, have been erected. To the scarlet-fever pavilion it is intended to add certain wings not yet built.



## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Site and soil.

Hospital  
buildings.

The site consists of six acres of land just outside and to the south-east of the borough. It lies in the urban sanitary district of Leckhampton, in a well isolated position, and it is picturesquely situated not far from the foot of the Cotswold Hills. It is bounded on two sides by a public highway, and at present is enclosed by hedges only. The soil is lias clay.

With the exception of a gardener's cottage, which was purchased with the site, all the hospital buildings have been erected from the designs and under the superintendence of Messrs. J. Middleton and Son, architects, of Cheltenham. They are all substantial and elegant buildings consisting of red brick ornamented with black and white glazed brick bands, and having high roofs of dark brown tiles. The window mullions and tracery are of oolite stone. (See Plates, Nos. IV. to XII.)

The Administrative Block consists of two stories in addition to a basement. On the ground floor is an entrance hall and a passage passing from before backwards and being continuous with a corridor leading to the scarlet-fever pavilion. On one side of the passage are two rooms for the medical officer, a dispensary, waiting room, lavatory, and water-closet. On the other side are the matron's sitting room, kitchen, scullery, larder, store rooms, &c. There is also a servants' water-closet in yard outside. On the upper floor are four bedrooms, and a dressing room for the staff, and for the occasional relatives or friends accompanying patients; a dormitory for nurses, divided by a central passage into four cubicles which are separated from each other by ornamental stained pine partitions 7 feet in height, but not reaching below to within about 6 inches of the floor level; together with a linen store, bath room, and water-closet. In the internal arrangements and construction of this building every effort has been made to make it attractive. The passage is shut off from the porch and the corridor by doors fitted with ornamental stained glass, the large staircase window midway between the two floors has been similarly fitted by private contributions, the porch and passages are paved with ornamental tile, and the passage walls are ornamented with glazed bricks. The rooms are, throughout, provided with casement windows, and all the sitting rooms are fitted with open fire places lined with glazed brickwork and having chambers behind them, from which hot air emerges above the fireplaces. These rooms are also provided with "Tobin ventilating tubes," and with Sheringham's ventilators near the ceiling level. The fenders are of stone. The wood-work is throughout of stained pine, the patterns of the panels, &c. having been carefully selected. The building generally is warmed by hot-water pipes which are purposely carried into the store-rooms for bedding and linen, and also by means of an ornamental "Doulton's Regulating Tile Stove," which when once lighted is stated to need no further attention for over 12 hours.

The corridor leading from the administrative block to the scarlet-fever pavilion is also constructed of red brick and stone, and it is lined inside with ornamental brickwork. It admits of cross ventilation by means of windows, and two doors in the opposite side walls, but there is no permanent opening separating by a cross-current of air the two buildings between which it passes.

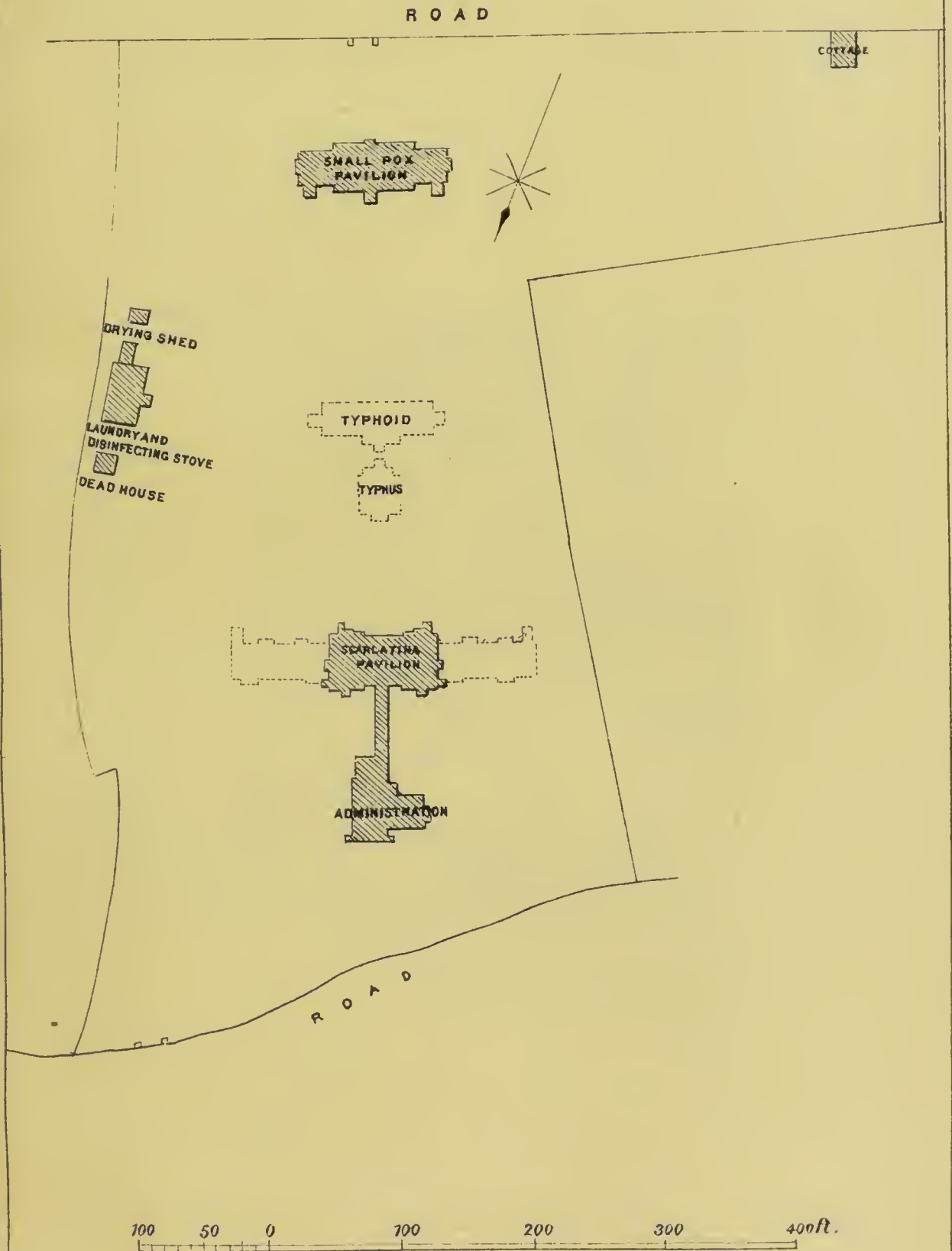
The Scarlet-fever or "The Gabell" Pavilion was opened in April 1877. It is an oblong building, the two longer sides of which face nearly north and south, and it contains two stories and a basement. The building, which stands on a terrace of burnt brick ballast, is of red brick with a tile roof, and has externally much the same stone and glazed brick ornamentation as the administrative block. The basement contains coal, and wood, and other cellars, and a furnace for heating the hot-water apparatus by



# DELANCEY HOSPITAL, CHELTENHAM.

## *Block Plan*

*(Those portions shewn in dotted lines are not yet built)*



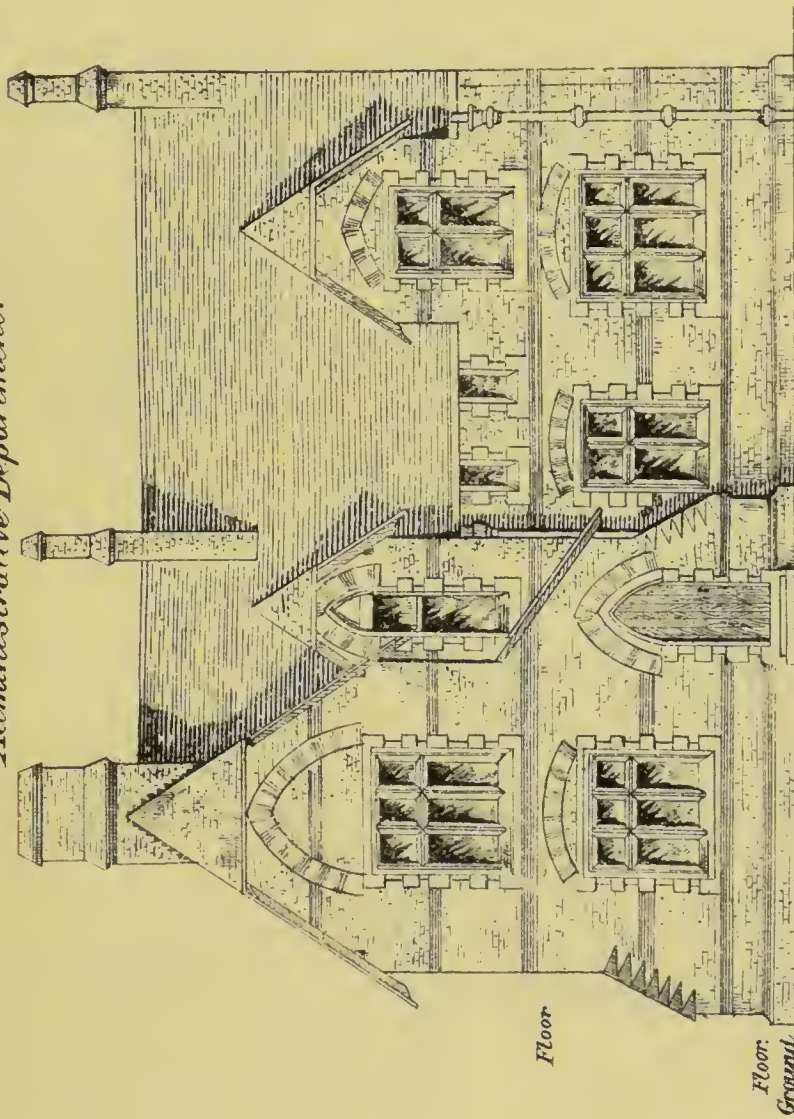
*Middleton & Son*  
*Architects*  
*Cheltenham.*





DELANCEY HOSPITAL CHELTENHAM.

*Administrative Department.*



*Floor*

*Floor  
Ground*



FRONT ELEVATION.

*Middleton & Son  
Architects  
Cheltenham*



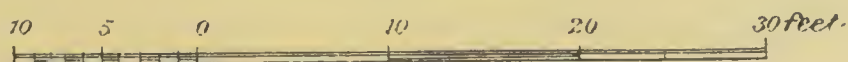


# DELANCEY HOSPITAL CHELTENHAM.

## ADMINISTRATIVE DEPARTMENT.



GROUND PLAN.



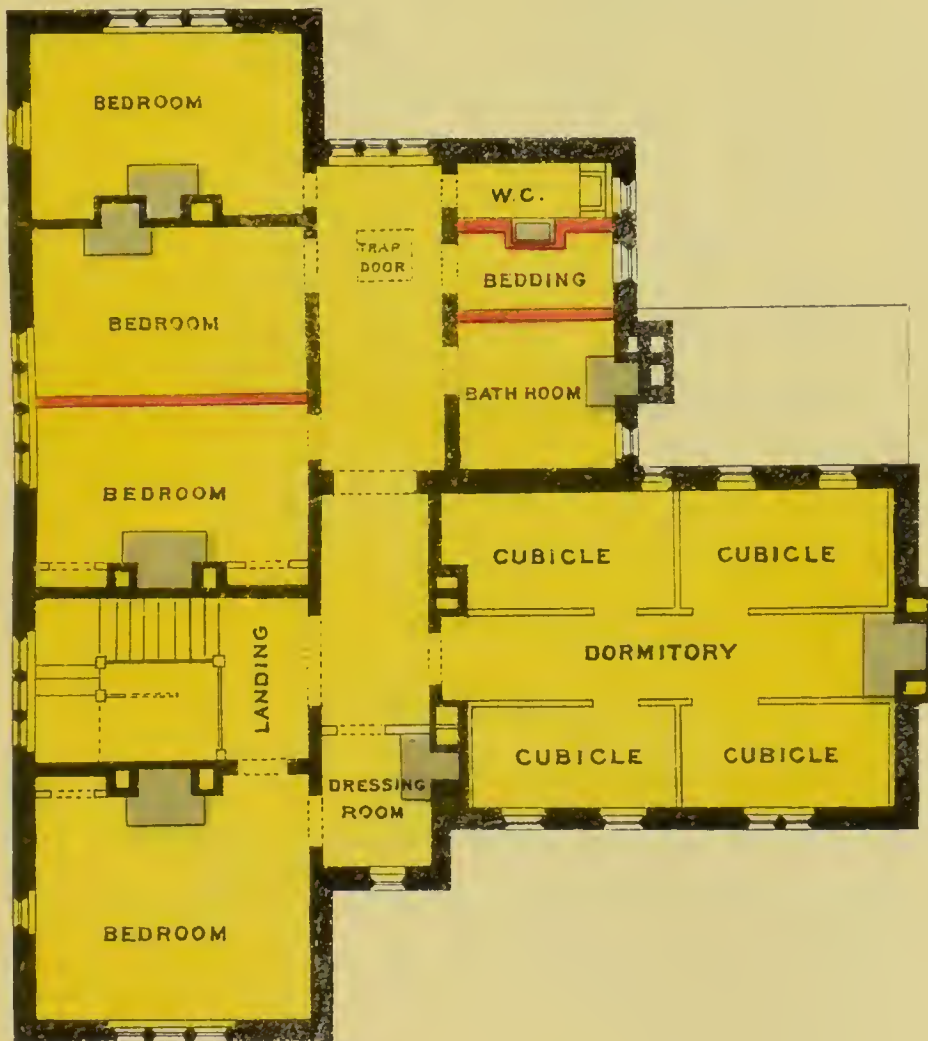
Middleton & Son  
Arch<sup>ts</sup> Cheltenham.





# DELANCEY HOSPITAL CHELTENHAM.

## ADMINISTRATIVE DEPARTMENT.



CHAMBER PLAN.



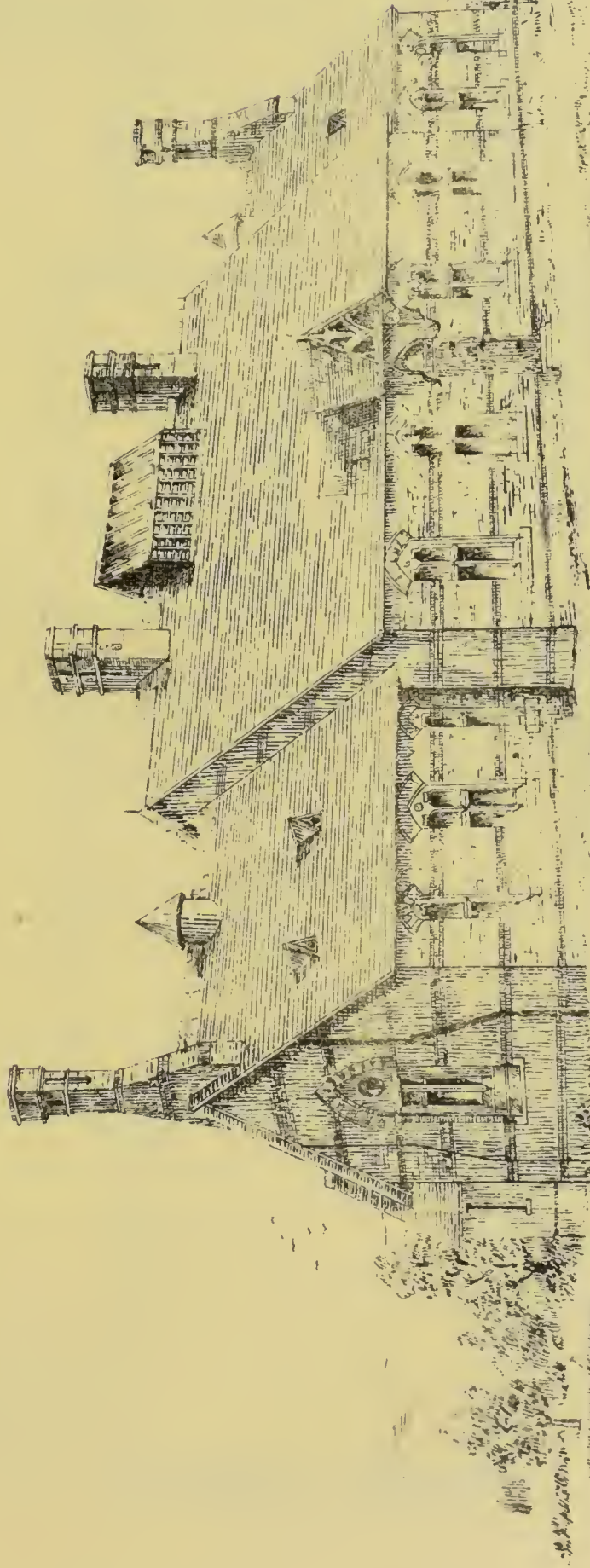
*Middleton & Son  
Archts Cheltenham.*





DELANCEY HOSPITAL CHELTENHAM.

*Small Porch Pavilion.*



*Middleton & Son,*

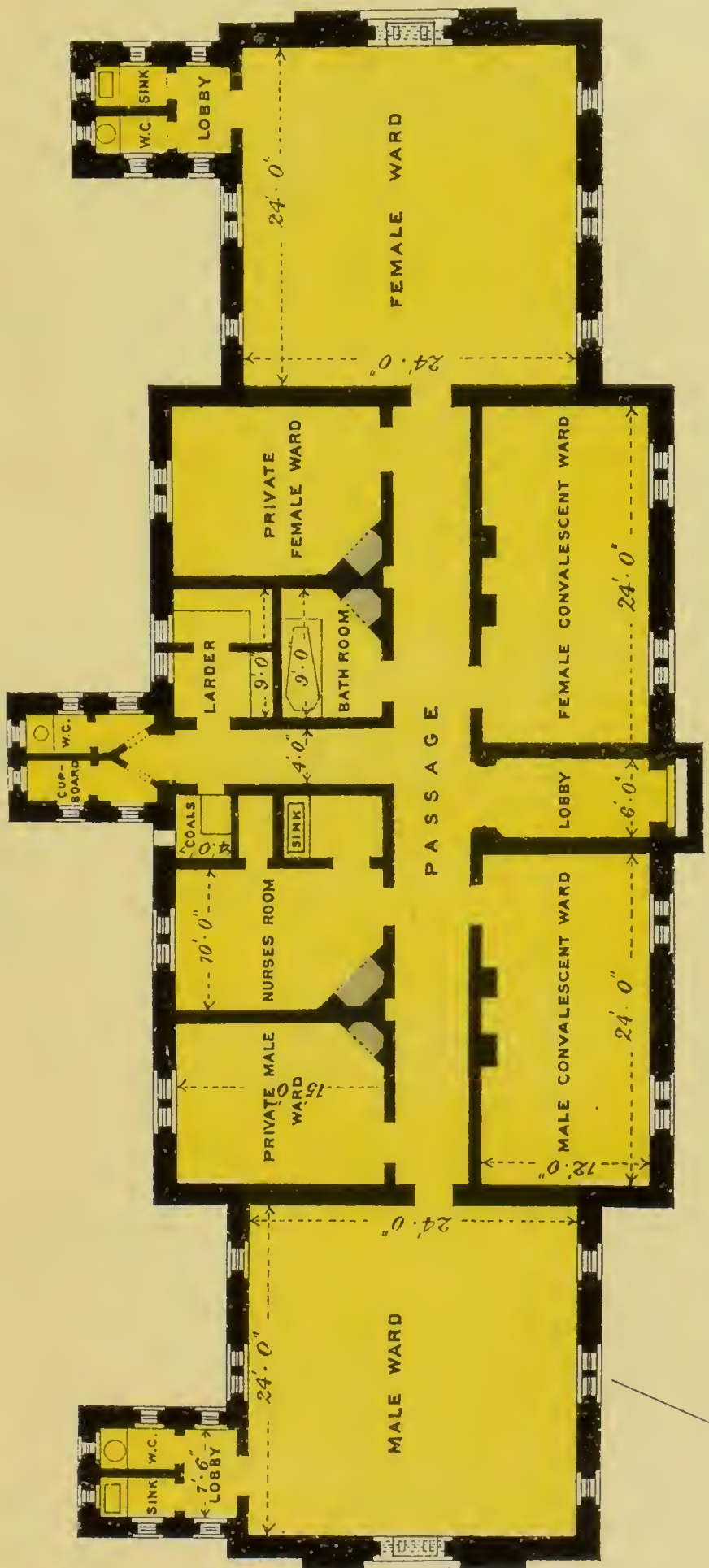
*Architects*

*Cheltenham.*





DELANCEY HOSPITAL, CHELTENHAM.  
*Small Pox Pavilion.*



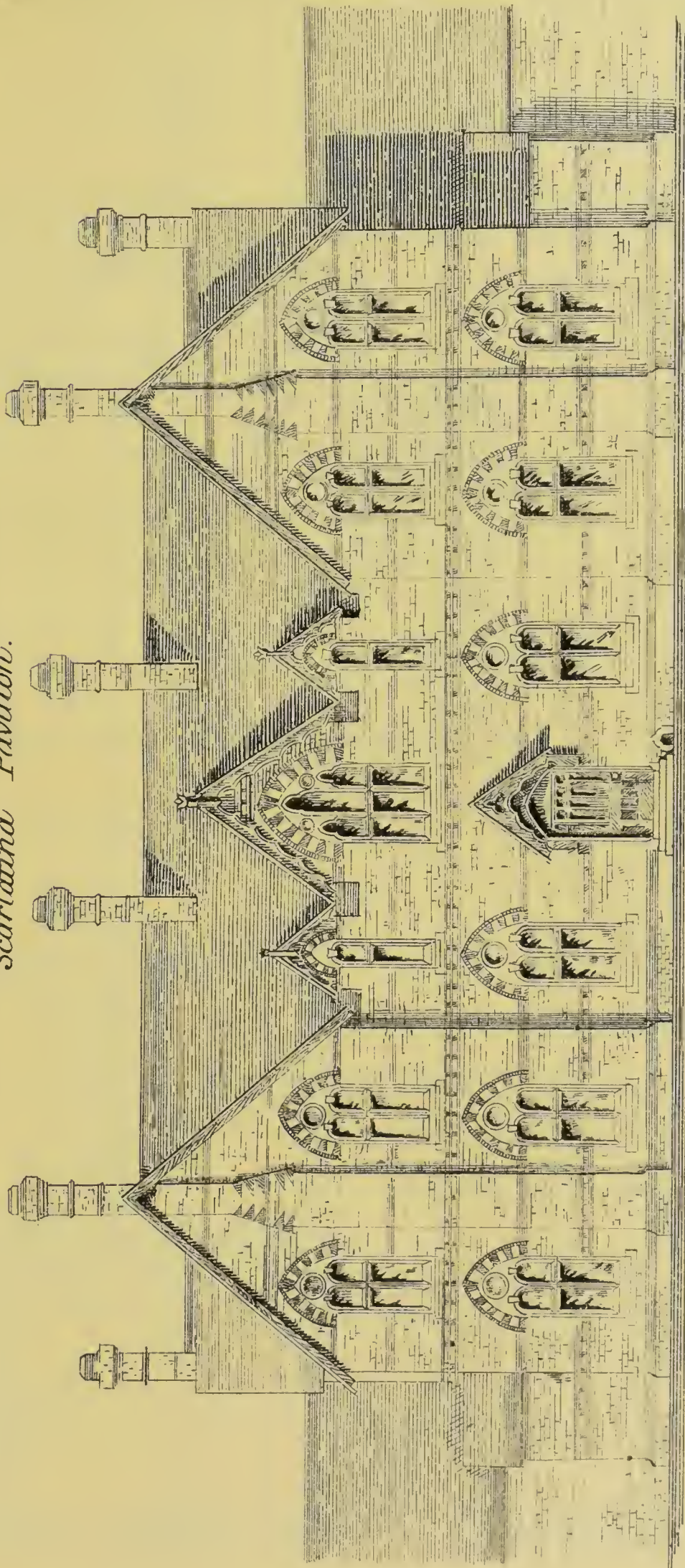
GROUND PLAN.

*Middleton & Son  
Architects  
Cheltenham.*





DELANCEY HOSPITAL CHELTENHAM.  
*Scarlatina Pavilion.*



FRONT ELEVATION.

10 5 0 10 20 30 40 50 ft.

Middleton & Son  
Architects  
Cheltenham.





DELANCEY HOSPITAL CHELTENHAM.  
SCARLATINA PAVILION.



BACK ELEVATION.



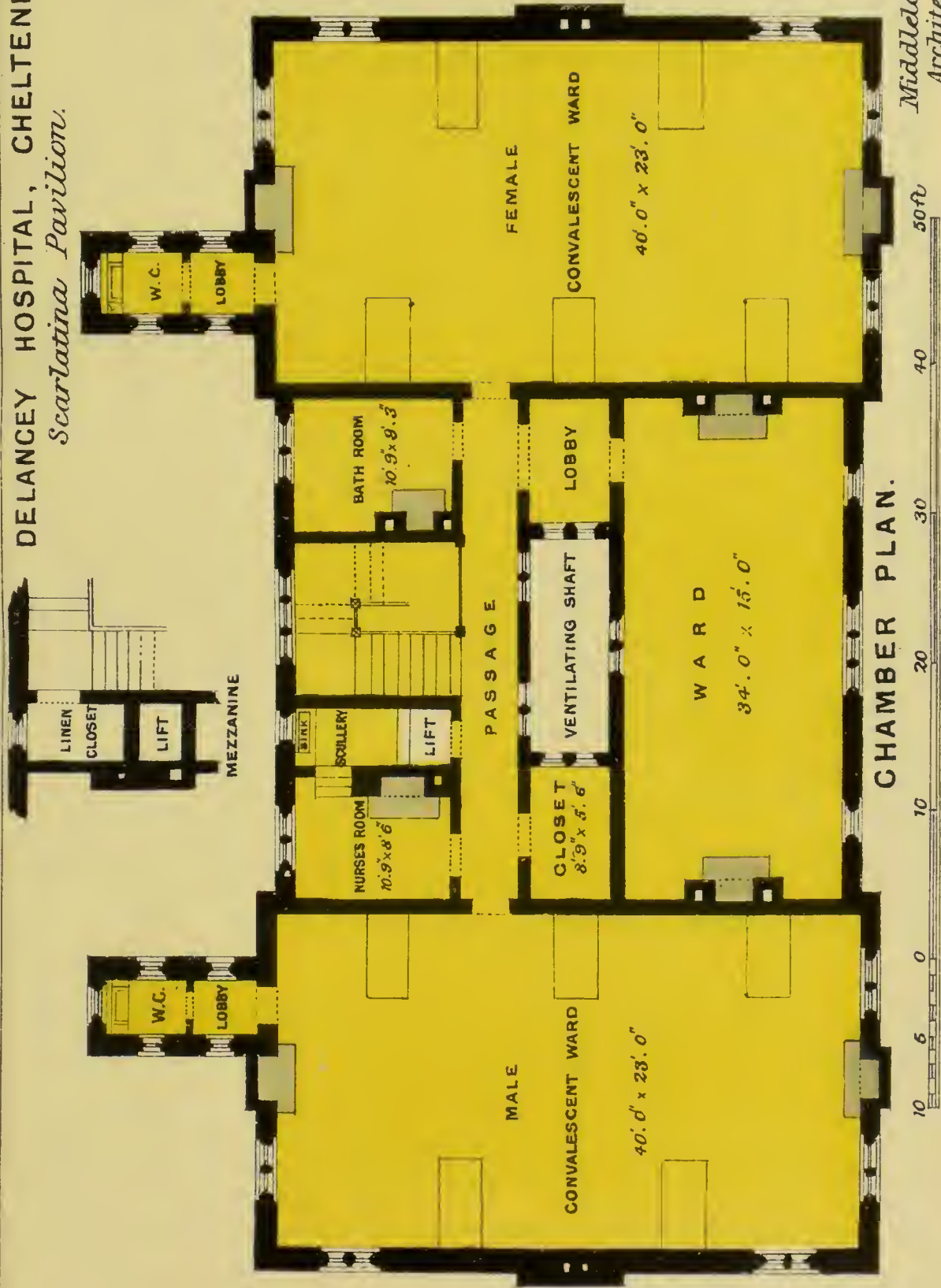
GROUND PLAN.

Millett & Son  
Architects  
Cheltenham





DELANCEY HOSPITAL, CHELTENHAM.  
*Scarlatina Pavilion.*



Middleton & Son  
Architects Cheltenham.





which the passages and main body of the building are warmed. The ground floor is divided both from end to end and from before backwards by means of corridors, which, meeting in the centre, form a lofty hall lighted by a double skylight and bounded by stone archways supporting the upper floor. The walls of these corridors are faced to a height of 6 ft. 6 in. above the floor, with ornamental black and white glazed brick, strings of the same forming lines in the white stock brick walls above. On one side of the longitudinal corridor are four private wards, varying in size from 16 ft. 3 in.  $\times$  13 ft.  $\times$  13 ft. to 15 ft.  $\times$  13 ft.  $\times$  13 ft.; and two nurses' rooms, one of which is fitted with a small kitchener, and opens out into a small ward-scully. On the other side are also four private wards varying in size from 16 ft. 9 in.  $\times$  13 ft. 6 in.  $\times$  13 ft., to 15 ft. 6 in.  $\times$  13 ft.  $\times$  13 ft., a lift and a bath room, watercloset for the staff, and two waterclosets for patients, the latter closets being reached by means of a passage running off from the main corridor at right angles, and being separated from the main building by means of cross-ventilated lobbies. Each end of the building thus contains four wards, a nurse's room, closet, &c., and one end is reserved for males, the other for females.

The private wards, as will be seen, vary in floor space from 195 to 217 square feet, and in total capacity from 2,535 to 2,821 cubic feet; and they are intended for the reception of single patients, or, especially in the case of the larger ones, of two children belonging to the same family, or, again, of a child accompanied by its mother or its own nurse. These wards have each one window, consisting of two casement sashes below and of swinging sashes above; they are provided with open fire-places ornamented with tiles and having stone fenders; the floors are of varnished pine, the walls are of plaster covered with a coloured wash; and there is an absence of any cornice or other projection which could favour the accumulation of dust. The furniture for these rooms consist, with the exception of the bedsteads, of polished pine, the wash-hand stands being fitted with marble tops. The bedsteads are of iron, and are mostly fitted with palliasses and hair mattresses. But these beds are, however, now being discarded, and the "Excelsior" spring bedstead and mattress combined, which is manufactured by Messrs. Chorlton and Dugdale, of Blackfriars Street, Manchester, is replacing the former bedstead and palliasse, and I am informed that when provided with a thin hair mattress it is not only far more comfortable but also much more cleanly than the ordinary bedstead and bedding hitherto in use. In the mezzanine on the staircase is a linen closet warmed by hot-water pipes.

The upper floor contains at either end a ward at present used for public patients, and measuring 40 feet in length and 23 feet in width. The walls of the wards are 10 ft. 6 in. in height to the wall plate, and 14 ft. 9 in. to the flat ceiling at the collar of the roof, the floor-space being 920 square feet, and the total capacity 12,420 feet. These wards are provided with large casement windows, two in one side wall, a single one in the opposite one, and two in the outer end wall; air grates are placed beneath the beds just above the floor level, and ventilating shafts pass from the centre of ceiling through the roof. Projecting from one of the side walls of both of these large wards is a building containing a watercloset, both the closets themselves and a lobby intervening between them and the wards they are attached to, being provided with windows, affording means of cross-ventilation. In the centre of this floor is a passage-way and a ventilating shaft, having on one side of it a nurse's room, bath-room, lift-shaft, and scullery; and on the other side a store-closet and a large convalescent



room, measuring 34 feet in length, 15 ft. in breadth, and being of much the same height as the large wards. It has thus a floor space of 410 square feet, and a total capacity of 5,535 cubic feet.

When this pavilion is completed it will, in addition to that portion already described, contain at either end on the ground floor, a public ward, one for males and one for females. These wards will be approached by the main passage running through the building; they will each contain 12 beds, and a view of them will, by means of fixed windows, be obtained from the nurses' rooms, which at the present time occupy the ends of the building.

The Small-pox Pavilion was opened in July 1874, and it is, both externally and as regards its internal construction and ornamentation, very similar to the buildings already described. All its rooms are, however, on the ground floor. Like the scarlet-fever pavilion, its longer sides and windows face nearly north and south. The main body of the building is traversed by a passage running east and west. On the north side of this passage are an entrance hall and two convalescent wards, the latter measuring 24 ft. long, 12 ft. wide, and 13 ft. 3 in. high. To the south of the passage are two private wards for single patients, each measuring 15 ft.  $\times$  12 ft.  $\times$  13 ft. 6 in., a nurse's room and kitchen in one, a scullery, bath room, larder, and coal-store. A ward-cupboard and a watercloset also occupy a projection to the south of the main building; they are themselves amply ventilated, and they are approached by means of a lobby having windows in the opposite side walls. At either end of the main body of the building is a general ward, one for males, the other for females. Each of these wards is 24 ft. long and 24 feet wide; the height being 13 ft. 3 in. to the top of wall plate and 18 ft. to the flat portion of the ceiling at the collar of the roof. They thus each contain 576 feet of flow-space, 9,216 cubic feet, and they are intended for four beds each. These wards are provided with three windows in one side wall, two in the opposite one, and one in the outer end wall above the open fireplace. The windows consist of two fixed sashes below and of two small pivot-hung sashes above, which are opened by means of an iron lever. Air is also extracted by a siphon ventilator in each ward; and there is a grating under each bed admitting fresh air from the outside. In a projection from each of these wards are a well-ventilated watercloset and a sink, which are approached by means of a lobby having means of cross-ventilation. The fireplaces are throughout open grates.

Water-supply  
and drainage.

The water supply for the hospital buildings is derived from the mains of the Cheltenham waterworks, and the drainage is into the public sewers of Leckhampton. The soil pipes of all the waterclosets are provided with a ventilating shaft, which is carried up above the roof; the diameter of the shaft is, however, far too small. Some of the drain pipes leading from the interior of the hospital buildings are in unbroken communication with the main drain; there is, however, in the course of each main drain leading to the public sewer a "siphon" bend having Brook's patent air-shafts on the hospital side of the traps.

Disinfecting  
stove.

Beneath the laundry, and approached from without by an incline, is a disinfecting stove. It consists of a brick chamber having iron doors, and also iron plates in the floor. Into and beneath the stove projects a furnace. Owing to the burning of some bedding which on one occasion fell on to the floor when the thermometer only indicated a temperature of 240° Fahr., the gardener, who at present has charge of the stove, has hitherto, when using it, only raised the temperature to 160° Fahr., but sulphur is, at the same time, burned in it. When other articles than



those belonging to the hospital or patients in the building are dealt with in the stove a charge is made by the managing body of the hospital.

The total number of patients admitted into the Delancey Fever Hospital since it was first opened in 1874 has been as follows:—

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Admission of patients.

—				Small-pox.	Scarlet Fever.
1874	...	...	..	8	—
1875	...	...	...	3	—
1876	..	...	...	2	—
1877	...	...	...	4	29
1878	...	...	...	—	20
1879	...	...	...	3	21
1880	...	...	...	4	32
1874-80	...		.	24	102

All of these patients were derived from the borough of Cheltenham excepting the four cases of small-pox cases which came under treatment in 1880, and which were sent in from the Leckhampton urban district.

Use of the hospital by (a.) Leckhampton urban authority.

But few of them, however, were sent in by the Cheltenham Urban Sanitary Authority, four small-pox patients, namely, one in 1877 and three in 1879, together with 10 scarlet-fever patients in 1877, being the only ones as yet sent in by that authority. Hitherto, the corporation have made no arrangement with the trustees of the Delancey Hospital for the reception of cases of infectious diseases requiring isolation on public grounds. It is true that in 1877, and after the admission of the 10 cases of scarlet fever referred to, they passed a resolution to the effect that they would pay the usual fees demanded by the trustees for the care and treatment of any patients not being paupers who were sent into the public wards by the Medical Officer of Health, and also for any articles of clothing disinfected; but since that date only three patients suffering from small-pox have been sent in by them, and no payments have been made for the stoving of any infected articles. The guardians of the Cheltenham Union have also at times sent paupers into the hospital; six cases of small-pox having been sent there, namely, four in 1874 and two in 1875, and also one case of scarlet fever in 1879. No paupers have been received in pauper dress, neither have they been attended by the poor law medical officer, and owing to the arrangements of the buildings, they have always been kept apart from the better class patients who constitute by far the larger proportion of patients admitted.

(b.) Cheltenham urban authority.

(c.) Guardians of the Cheltenham Union.

The Delancey Hospital is referred to in a return made by the Cheltenham Rural Sanitary Authority as available for their district. No case has, however, been sent in by them.

(d.) Cheltenham rural authority.

Of the 24 cases of small-pox received into the hospital four were treated in the private wards, and 10 paid for admission into the general wards; and of the 102 scarlet-fever patients admitted, 33 used the private wards and 59 paid for admission into the general wards. The patients using the private wards are mainly derived from the families of gentlemen, or the professional classes, a few being pupils from the

Paying patients.

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several collegiate establishments. From one of these establishments a yearly retaining fee of 25*l.* is received on the condition that at least one private ward shall be reserved, and that additional beds shall be available if not otherwise required, on payment of 5*s.* a day per patient. Those paying for isolation and treatment in the general wards are as a rule servants or members of the families of tradesmen and the labouring classes.

The ordinary charge made for the use of a private ward is 10*s.* 6*d.* a day, exclusive of nurses' wages, when any addition to the hospital staff is required, together with fees for medical attendance; the choice of a medical man being left with the patients or their friends.

Patients within the area of the Cheltenham Union suffering from small-pox are admitted to the general wards at a charge of 2*s.* 6*d.* a day, and those suffering from scarlet fever at 3*s.* a day. The domestic servants of subscribers of one guinea per annum are received gratuitously if suffering from small-pox, and at half the usual charge if suffering from scarlet fever. The authorities of the Cheltenham General Hospital are also allowed to send in any case of either of the diseases named which break out in the hospital wards, free of charge.

The management of the hospital is vested in a body of trustees, to whom Dr. E. T. Wilson, F.R.C.P., one of their number, acts as honorary secretary. The general and medical administration is in the hands of Dr. A. B. Rye, of Cheltenham, who until the end of 1880 attended all patients admitted into the general wards. Since then, however, the trustees have, in the hope of making the hospital more generally useful, passed a resolution enabling all patients in the general as well as in the private wards to be attended, at their own cost, by medical practitioners of their own choice. The permanent resident staff consists of a matron, whose general management of the hospital and care of the patients is very highly spoken of, one nurse, a cook, and a gardener who also acts as porter. Additional nurses are provided by the patients themselves or by the trustees, as occasion requires.

Visitors are as a rule not allowed to enter the wards except when grave symptoms, the occurrence of which is always communicated to the nearest friends of the patients concerned, supervene. The friends of patients are, however, on receiving permission to that effect from the medical practitioner in attendance, allowed at frequent intervals to see patients through the ward windows.

The results which have followed on the isolation of cases of small-pox and scarlet fever in the Delancey Hospital are highly spoken of both by Dr. T. Wright, F.R.S., the borough medical officer of health, and by the medical officer to the hospital. In 1858 small-pox caused 52 deaths in Cheltenham, in 1861 it caused 12 deaths, and in 1865 32 deaths, whereas, writing in his annual report for 1880, Dr. Wright says:—"During the last six years small-pox has been introduced into the town on twelve separate occasions by cases which . . . were imported from infected districts; all these patients I removed into the Delancey Hospital as soon as they were discovered, and in each case the disease never extended beyond the house in which it first occurred." Similar testimony is also borne as regards the isolation of scarlet-fever patients.

In addition to the Delancey Hospital, two private hospitals, one belonging to the Ladies' College and the other to the College for Boys, have recently been established for the reception of any cases of scarlet-fever that may arise, and cases of enteric fever are received into the Cheltenham General Hospital. The two private hospitals have as yet been little used, but the cases of "fever" received into the latter institution

General and  
medical ad-  
ministration.

Visitors.

Results of  
isolation.

Further means  
of isolation for  
Cheltenham.



are given in the annexed table, which shows the total deaths registered in the borough of Cheltenham from the three infectious fevers which have been isolated, and the number of patients admitted from the borough into either Delancey Hospital or the General Hospital, during the four years 1877-80.

APP. NO. II.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Total isolation carried out in hospital.

Date.	Small-pox.		Scarlet fever.		"Fever."	
	Deaths* registered.	Admitted into Delancey Hospital.	Deaths* registered.	Admitted into Delancey Hospital.	Deaths registered.	Admitted into General Hospital.
1877 ... ..	—	4	16	29†	11	12‡
1878 ... ..	—	—	—	20	14	5‡
1879 ... ..	—	3	—	21	5	1
1880 ... ..	—	4	5	32	1	3‡
1877-80 ...	—	11	21	102	31	21

There are but few dwellings in the immediate vicinity of the Delancey Hospital. The nearest houses to the small-pox pavilion are to the east of the site in the hamlet of Pilley and lie at a distance of 120 ft. from it. Others lying to the north-west of the site are 168 ft. and 225 ft. respectively from the administrative block and the scarlet-fever pavilion. In no case has any spread of infection been alleged or known to have taken place, either from the hospital itself, or by means of nurses or ambulances.

Influence of hospital on the surrounding district, &c.

The cost involved in the erection of the Delancey Hospital, apart from the purchase of the site, has been as follows:—

Cost of construction, &c.

Erection of the Small-pox Pavilion, with roads, water, and gas supplies, &c.	£	s.	d.
- - - - -	2,923	0	0
Erection of the Scarlet Fever Pavilion, with roads, water, and gas supplies, &c.	4,239	0	0
Erection of the Administrative Block, with roads, water, and gas supplies, &c.	2,393	15	6
Construction of covered corridor	165	0	0
Construction of wash-house, laundry, drying apparatus, &c.	498	0	0
Construction of drying shed	48	0	0
" " mortuary	65	0	0
Disinfecting apparatus	107	0	0
	10,438	15	6
Furnishing, &c., Small-pox Pavilion	154	0	0
" " Scarlet Fever Pavilion	350	0	0
" " Administrative Block	178	6	6
	£11,121	2	0

\* These deaths include those of persons from Cheltenham who have died in the Delancey Hospital, which is outside the borough.

† Scarlet-fever Pavilion not opened till April 1877.

‡ The numbers in 1877 and 1878 may possibly include some diseases which should not strictly come under the designation "fever," as used by the Registrar-General.

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tenance.

The total number of beds at present available is 32. When, however, the wings to be added to the scarlet-fever pavilion have been erected, at an estimated cost of 1,450*l.*, the number of beds will be increased to 56. Excluding the cost of the site, the cost per bed (including nurses' beds) in the small-pox pavilion has been 209*l.*, and when the two wings are added to the scarlet-fever pavilion the cost per bed in that building will be 129*l.* 9*s.* 0*d.*, and in the entire hospital 224*l.*

During the two years ending respectively December 31, 1879 and 1880, the total cost of maintenance, excluding certain items for additional furnishing during the second year, was 734*l.* 13*s.* 2*d.* and 731*l.* 17*s.* 7*d.*, each of these amounts including a sum of about 450*l.* for wages and housekeeping, and a honorarium of 42*l.* to the medical officer. In the year ending December 1879, however, a sum of 594*l.* 6*s.* 1*d.* was received from subscriptions, legacies, and interest on funded property, together with 124*l.* 6*s.* repaid for the isolation of patients and for disinfection; and in the year ending December 1880, sums amounting respectively to 514*l.* 0*s.* 11*d.* and 359*l.* 14*s.* 11*d.* were received from similar sources.

### CHESTER URBAN SANITARY DISTRICT.

Population in 1881, 36,788. Rateable value, 144,000*l.*

Origin of the  
hospital.

About eight years ago the Board of the Chester Infirmary received a donation of 500*l.* towards the erection of a special building for the isolation and treatment of cases of infectious diseases. This being supplemented by public subscriptions and by the balance of some invested funds, a "Fever Hospital" was erected on the Infirmary grounds, at a cost of 1,445*l.* 10*s.* 3*d.* inclusive of furniture and fittings.

Site.

The General Infirmary lies within the borough of Chester, and near the north-western outskirts of its most inhabited portions. Fronting it, and to the east is a piece of land 255 feet long, and having an average width of about 170 feet, and on this the "fever hospital" has been built. The site is separated from the entrance drive by means of a wall, but otherwise it is not shut off from the Infirmary premises.

Hospital  
buildings.

The buildings belonging to the Fever Hospital are:—1<sup>o</sup>, a ward-pavilion, 2<sup>o</sup>, a detached house, and, 3<sup>o</sup>, a mortuary.

The Ward-Pavilion is a substantial red brick building with strings of black brick and a slate roof, and it consists of a basement, one floor containing the principal wards, and an upper floor in the centre of the building. All external walls are 15½ in. thick. The basement which is half-sunk contains a laundry, cellars, store-rooms, &c. In the centre of the ground floor is the entrance hall, and certain administrative apartments, including the kitchen, nurses' rooms, bath rooms, lavatories, &c. On either side of these is a ward, one for males, and the other for females.

Each ward is 59 feet long by 22 feet wide; and the height is 12 ft. 4 ins. to the top of the wall plate, and an additional 2 ft. 9 ins. to the flat ceiling at the collar of the roof; thus giving a total of 1,298 feet of floor space, and some 19,000 cubic feet. The accommodation thus afforded should be regarded as sufficing for a maximum of ten "fever" patients in each ward, but at the date of my visit the number of beds, apart from cots, considerably exceeded this number.

There are in each ward eight windows, four in each opposite side wall. Each window consists of double-hung sashes surmounted by a pivot-hung sash, the top reaching to within 18 inches of the wall-plate. Additional means of ventilation consist of a ventilating shaft, fitted with a diaphragm, and passing through the roof, and of two small apertures in the outer end wall, at a somewhat higher level than the wall-plate.



At that end of the wards which is nearest the central part of the building the windows are at a considerable distance from the angles, which are in consequence imperfectly lighted. From one of these angles a watercloset is approached by means of a lobby. Neither the lobby nor the watercloset is provided with means of cross-ventilation, both having one window only. Each ward is warmed by means of an open fire-place in its outer end wall, and of a slow combustion stove fixed against one of the side walls.

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The upper floor, which occupies the central portion of the building only, is divided by means of a partition wall into two portions, which are reached by separate staircases, but which communicate with each other by means of a passage-room occupying a central position at the back of the building. This room has a floor space of 165 square feet, a capacity of about 1,770 cubic feet, one double-hung sash window, a roof ventilator, and an open fire-place, and though now furnished for the use of patients, it was doubtless originally intended as a nurse's room. In addition, there are on either side of the partition wall:—1°, a ward-room having a floor-space of 232 square feet, a capacity of some 2,490 cubic feet, and being fitted with two double-hung sash windows, one in each of two adjacent walls, an open fire-place, and a roof ventilator; 2°, a smaller room for a nurse or scrubber; 3°, a linen or store closet; and 4°, a lavatory and sink, and a watercloset opening directly into the building.

The detached "Fever House" adjoins the porter's lodge near the entrance gate; it is a two-storied building containing two rooms on the ground floor and three upstairs. One room on each floor is intended for the reception of patients; it measures 21 feet  $\times$  17 feet  $\times$  10 feet, it has windows in one wall only, and it is provided with an open fire-place. Opening out of each of these rooms is a lavatory, provided with one window and forming a lobby to a watercloset beyond. The other rooms are reserved for nurses and for administrative purposes.

Assuming both the ward-pavilion and the detached house to be occupied by patients, and several of the rooms in each to be necessarily set apart for nurses and scrubbers, the amount of accommodation available in the two buildings would thus afford adequate means for the isolation of some twenty-seven patients, and of the simultaneous treatment of persons of both sexes suffering from two different diseases.

The mortuary lies within about 4 feet of the ward-pavilion, but at a lower level; it being approached from a wide area which surrounds the basement. It answers the purposes of the infirmary as well as of the fever hospital, and it is fitted as a post-mortem room. The only means of disinfection available is a "fumigating chamber" which belongs to the general infirmary buildings and in which articles can be exposed to the fumes of burning sulphur.

Mortuary;  
disinfection.

The water-supply is derived from the town mains. The drainage is into the public sewers, there being, apart from the watercloset soil-pipes, no direct communication between the sewers and the interior of the buildings. The soil-pipes are in each case carried up above the level of the roof, but the drains are not provided with any means of through ventilation, neither is there any trap between them and the public sewer.

Water-supply  
and drainage.

A brougham stripped of its linings and a hand ambulance fitted with a movable stretcher are kept in a shed at the Town Hall for the purposes of removing patients to the hospital. Such removal is effected free of cost as regards patients in the urban district, but the expenses of a man and horse are charged as regards patients from other districts.

Ambulance.

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Admission of  
patients.

The number of patients suffering from small-pox, scarlet fever, and "fever" received into the Fever Hospital from the borough of Chester, together with the total deaths registered in that district from the diseases specified, during the five years 1876-80 have been as under:—

Date.	Small-pox.		Scarlet Fever.		"Fever."	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1876 ... ..	1	3	70	6	21	14
1877 ... ..	2	8	19	7	17	17
1878 ... ..	—	—	40	35	19	34
1879 ... ..	—	1	46	22	7	8
1880 ... ..	—	—	34	42	11	21
1876-80 ... ..	3	12	209	112	75	94

Use of the hospital by other sanitary districts, i.e.:—

Some 40 patients, suffering from chicken-pox, diphtheria, diarrhœa, &c., were also admitted during the same period.

According to the Hospital Returns received by the Local Government Board, the Chester Fever Hospital is referred to as serving, more or less, the requirements of the Hoole urban, the Chester, Tarvin, and Wirral rural, and the Chester port sanitary districts, and with the aid of Dr. Woodward, the resident medical officer to the Infirmary, the books have been examined for the years 1879 and 1880 with a view of ascertaining the number of patients admitted from these several districts.

(a) Hoole urban district :

In the Hoole urban district (population 2,275 in 1881) the deaths registered in 1879 included 2 from "fever" and 4 from scarlet fever; and in 1880 one from "fever" and 5 from scarlet fever. In his annual report for 1880 the Medical Officer of Health says, as regards such diseases, "the chief difficulty . . . is in isolating them." The hospital is reported as having been available for the district since 1875, and to be one mile distant. No cases were sent in during the years 1879 and 1880.

(b) Chester rural district :

No definite arrangement has apparently been made by the rural sanitary authority of Chester as to the admission of cases into the Chester Hospital, but cases are occasionally sent in from that district. In 1879 the deaths registered in this district (population 7,515 in 1871) included 11 from scarlet fever and 5 from "fever"; and in 1880, 4 from scarlet fever and 4 from "fever." In the former of these years seven "fever" patients, and in the latter three scarlet fever patients were sent into the hospital.

(c) Tarvin rural district :

In the Tarvin rural sanitary district (population 11,383 in 1871) the deaths for 1879 included 7 from scarlet fever and 2 from "fever," and those in 1880, 2 from scarlet fever. In 1879, three patients, 2 suffering from scarlet fever and 1 from enteric fever, and in 1880, 1 suffering from enteric fever, were sent to the Chester Fever Hospital. In the hospital return relating to this district, Dr. G. A. Kenyon writes, "From this district but few patients have been admitted to the "Fever Hospital, but in each case with beneficial results; there having "been no extension of the disease beyond the house originally infected."



Until recently cases have also for some years past been sent in from the Wirral rural district (population 13,233 in 1871); a separate hospital being now provided. In 1879 the deaths included 20 from scarlet fever and 1 from "fever"; and in 1880, 5 from scarlet fever and 5 from "fever." The admissions to the hospital in 1879 were 7 cases of enteric fever, and in 1880, 3 from scarlet fever and 2 from "fever."

As yet it has not been found necessary to use the hospital for the purposes of the port sanitary district of Chester.

The total admissions to the Fever Hospital from all these districts, which together with Chester contain some 71,000 inhabitants, during the three years 1878-80 have been as follows:—

—			Small-pox.	Scarlet Fever.	"Fever."	Other Diseases.
1878	...	...	—	40	53	5
1879	...	...	1	29	19	11
1880	...	...	—	48	22	5
1878-80	...	...	1	117	94	21

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(d) Wirral rural district.  
(e) Chester port district.  
Total admissions.

The administration of the Fever Hospital is entirely in the hands of the Board of Management of the General Infirmary and of its officers, the physicians and the resident medical officer having medical charge of the patients. Apart from these officers and one other official who carries the stores and uncooked provisions to the Fever Hospital, no person connected with the Infirmary is allowed to enter the building. Medical practitioners are allowed on application to visit patients in the hospital, but they take no part in the medical treatment.

Administration.

Visitors are only admitted to see patients by special permission of the medical staff, and this permission is, except in the case of such diseases as enteric fever, under ordinary circumstances only granted in the case of patients exhibiting grave symptoms.

Visitors.

In no case has compulsory removal to hospital been resorted to in the borough of Chester, but with a view of ensuring isolation the powers vested in the urban authority under section 124 of the Public Health Act, 1875, have at times been quoted to patients and their friends. Pressure is also brought to bear upon many of the patients by the refusal of the visiting surgeon attached to the infirmary to attend any cases of infectious fever in the houses of the patients. In the annual report for 1879 on the Tarvin rural district, Dr. Kenyon refers to two patients who whilst suffering from scarlet fever were certified as being without proper accommodation, and, as difficulties in effecting their removal to the fever hospital at Chester were anticipated, a magistrate's order was in each case obtained. The removal was then quietly effected.

Public Health Act, 1875, s. 124.

A charge of 14s. a week is made by the infirmary board for each patient admitted, this sum being, for the purposes of the urban district, supplemented by an annual grant of 50l. by the Corporation. Both in the Chester urban and rural districts the guardians pay the weekly fee on behalf of most patients who are, through poverty, unable to pay it themselves, whether they are in actual receipt of poor-law relief or not, repayment being in some cases afterwards demanded. The Corporation never pay the weekly maintenance fee. In no case has any action been taken by the rural sanitary authority of Chester to recover the costs of maintenance, under section 132 of the Public Health Act, 1875.

Payments on behalf of patients.

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Social status of  
patients.  
Paupers, &c.

Neither have any such proceedings been taken by the Wirral rural sanitary authority who pay for the patients sent in from their district irrespective of the question of pauperism.

The patients admitted have come almost entirely from that part of the population earning weekly wages, and from the class of domestic servants; the remainder being tradesmen's assistants, pupils, &c. Paupers are also admitted, but as they never wear a pauper uniform, their social status never transpires, and hence, no complaints as to mingling with paupers have ever been made by other patients.

Influence of  
hospital on  
surrounding  
neighbour-  
hood.

The position of the fever hospital buildings with regard to surrounding buildings, &c., calls for further consideration. 1°. The Ward-Pavilion is bounded to the north by a large open space. To the south it is separated by a smaller space varying from 80 to 90 feet in width, from a short row of cottages in a narrow thoroughfare known as the Long Edge, and from the nearest house on the western side of St. Martin's-in-the-Fields; in this space also lies the detached "fever-house." To the east is St. Martin's-in-the-Fields, a thoroughfare bounded on one side by the grounds adjacent to the fever hospital, and on the other by residences; the ward-pavilion standing at a distance of 27 feet from the thoroughfare, and 65 feet from the houses on the opposite side of the street. To the west, and at a distance of 75 feet from the ward-pavilion and of 55 feet from the adjoining mortuary, lies the main building of the General Infirmary. 2°. The house which is also occasionally used for the isolation of infectious diseases lies within less than 20 feet of the nearest house on the western side of St. Martin's-in-the-Fields, within 55 feet of the cottages in the Long Edge, and within the same distance of the houses on the eastern side of St. Martin's-in-the-Fields.

The ward-pavilion having occasionally contained some 20 scarlet-fever patients at one time, and having in 1871 been so full of small-pox patients that convalescents were transferred to the detached "Fever House," 38 small-pox patients in all being under treatment at the same time, I made every endeavour to ascertain whether there had been any spread of infection from any of the hospital buildings to the surrounding houses, but I was assured that no suggestion even of such spread had ever been heard of. In one instance, however, small-pox is believed to have been communicated to the family of a resident scrubber as the result of a visit which she paid to her home in Chester, whilst that disease was under treatment in the hospital; and in another instance when both enteric fever and small-pox were simultaneously under treatment in the ward-pavilion, an enteric fever patient sickened with small-pox three days after her discharge from the hospital, there being no small-pox in the borough apart from the cases in the hospital.

#### CLEATOR MOOR URBAN SANITARY DISTRICT.

Population in 1881, 10,420. Rateable value (1880), 29,929*l*.

#### EGREMONT URBAN SANITARY DISTRICT.

Population in 1881, 5,976. Rateable value (1880), 34,415*l*.

#### WHITEHAVEN RURAL SANITARY DISTRICT.

Population in 1871, 24,935. Rateable value (1880), 238,431*l*.

Hurried  
erection of  
hospital for  
small-pox  
cases.

The Whitehaven Rural Sanitary Authority after having had the question of the provision of means of isolation for infectious diseases under consideration for some years, made a proposal to the Cleator Moor Urban Sanitary Authority in June 1879 to the effect that they should



combine for this purpose, an outbreak of scarlet fever in the rural district being the immediate ground of this proposal. The Cleator Moor Urban Authority had previously suggested a similar course. But nothing was then done in the matter. Early in 1880, however, small-pox having in the meantime broken out in their districts, the two above-named authorities, together with the Egremont Urban Sanitary Authority, combined for the purpose of erecting a hospital. The matter having thus been deferred until the cases of disease to be isolated were actually in existence, nothing beyond a wooden erection could be thought of. This was put up in a very expeditious manner, and 10 days after it was commenced two cases of small-pox were admitted. These two were the last of an outbreak of 15 cases, some of which had occurred in the Whitehaven Rural, and some in the Egremont Urban District.

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Diseases, by  
Dr. Thorne.

The site is a suitable one. It consists of an acre of ground in an isolated and elevated position on the red sandstone formation, and has a steady fall towards the River Keekle. It lies in the parish of Hensingham, within the Whitehaven Rural District, and it is conveniently situated as regards the localities it is intended to serve. It immediately adjoins a principal highway, and lies within about one mile of Cleator Moor, four miles of Egremont, and within distances varying from about half a mile to four miles of the most populous parts of the rural district.

Site and soil.

The hospital itself is a one-storied double-walled wooden building, having lap-boarding outside and tongued and grooved boarding inside. The whole structure stands on stone pillars, by means of which it is somewhat elevated above the surface of the ground. The building has been painted outside, and the roof, which consists of single planks, has been covered with tarred felt. Inside, the walls, floor, and ceiling consist as yet of bare wood, but the difficulty of maintaining an equable temperature within a building so constructed will probably lead to some alteration in the construction of the roof.

Hospital  
buildings.

In the centre of the building are, 1<sup>o</sup>, two entrance porches, each leading towards a separate ward; 2<sup>o</sup>, a nurse's room, which has to serve as day-room, bed-room, and kitchen; 3<sup>o</sup>, a corridor, into which the nurse's room, both wards, and two closets open, and in which a space has been set apart for a movable bath; and 4<sup>o</sup>, in an offshoot from the main building, and separated from it by a lobby, provided with means of cross-ventilation, two earth-closets. On either side of this central administrative block are the two wards, both of which can be seen through windows in the apartment which has to act as nurse's room. The wards are each intended to accommodate four patients, each bed having a superficial area of 144 square feet, and 2,000 cubic feet. The wards are lighted by three double-hung sash windows, two being opposite to each other, and so affording means of cross ventilation, the third being in the end wall. These windows measure 5 feet 6 inches by 4 feet, and they are situated about midway between the floor and the highest part of the roof. There are, however, louvred openings in the roof and above the end window in each ward. Stoves are to be fitted in the centre of each ward.

Capacity of  
wards.

At present a spring in the field in which the hospital is situated forms the water-supply; this water is, however, very hard, and a much softer supply is to be laid on from the Cleator Moor mains. [This has, since my visit, been done.] The means of drainage are not yet finally determined on, but up to the date of my visit the liquid refuse had been conveyed from the building by means of a tank on wheels, and the contents disposed of on a part of the hospital grounds.

Water-supply  
and drainage.

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Imperfect  
character of  
hospital.

Cost of con-  
struction.

In a detached building are a wash-house and laundry and a mortuary. A shed to contain an ambulance, and some apparatus for disinfecting clothing and bedding are also about to be added.

This hospital is, therefore, adapted to receive cases of one infectious disease in both sexes. It has, however, some noteworthy defects. If ever used for two different diseases, there will be some risk of convalescents from one disease contracting a second owing to the joint use by patients from both wards of the corridor and lobby leading to the closets. If eight patients were at any time under treatment at least two nurses would be required, and the accommodation for nurses and staff, at all times insufficient, would then be seriously so. There are no proper store-rooms for linen, food, &c., a chest and some cupboards being alone available. Owing to the haste needed in the erection of the building, well-seasoned wood could not be procured, and already there are indications that shrinking has begun, and that interspaces, so liable to retain infective dust, are in process of formation.

The buildings were designed by Messrs. Pickering and Crompton of Whitehaven, and from them I have the following details as to cost:—

	£	s.	d.
Purchase money for the site (one acre) - - -	484	0	0
Erection of main building, including detached mortuary, washhouse, and laundry - - -	262	16	3
Erection of detached ambulance and disinfecting shed. (Tender received buildings in hand) -	56	2	5
Water-supply, to be brought 1,000 yards from the Cleator Moor waterworks - - -	70	19	7
Cooking and other stoves for wards, attendant's room, laundry, and washhouse - - -	14	11	6
Liquid waste-tank, barrow, earth-closets, &c. -	3	2	9
Chests, closets, &c. - - -	7	12	1
Bedsteads, mattresses, bath, &c. - - -	25	1	7
Bed clothing, crockery, &c. - - -	6	9	0
Probable legal expenses incurred in conveying land, &c. - - -	10	0	0
	<u>£940</u>	<u>15</u>	<u>2</u>

Distribution of  
cost.

In dividing the costs between the three Authorities, both population and rateable value were taken into consideration, and it was agreed the Rural Sanitary District should contribute 60 per cent., and the two Urban Districts 40 per cent. of the total sum.

Adminis-  
tration.

The hospital is under the direction of a joint committee, consisting of three members of the Whitehaven Rural, and two each of the Cleator Moor and Egremont Urban Authorities, and Dr. Syme, who is Medical Officer of Health for the former and the latter districts, is to undertake the general and medical administration of the establishment, with the treatment of the patients. The remuneration he is to receive for this is not yet determined. A man and his wife are at present in residence, the wife acting as nurse; they receive 1*l.* a week, together with coals and lights, but they board themselves.

Admission of  
paupers.

It should be added that the Guardians of the Whitehaven Union have entered into an arrangement with the joint committee for the reception into the hospital of pauper cases of infective diseases occurring within the Urban Districts of Cleator Moor and Egremont, at a rate of 1*l.* per week per patient, and they propose making a similar arrangement with regard to paupers resident in the Rural District. Each of the joint Sanitary Authorities will be charged with the costs of such patients as are sent in from their respective districts



## DARLINGTON URBAN SANITARY DISTRICT.

Population in 1881, 35,102. Rateable value, 155,000/.

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Hospital site.

The hospital provided by the borough of Darlington occupies a somewhat isolated site of about two acres in extent, to the east of the town. The site is walled in on all sides.

The exterior design is attractive, though simple. The building is substantially constructed of brickwork, with dressings of Dunhouse stone. All the external walls are 14 inches in thickness. The grounds around are laid out as a garden and are kept in good order.

The plans, which were designed by Mr. G. G. Hoskins, F.R.I.B.A., Darlington, consist of an administrative block, flanked on one side by a single pavilion, and on the other side by two pavilions, all of which communicate with the administrative block by a corridor, the continuity of which is broken between the blocks by a covered carriage way, open at the sides. The roof of this corridor is flat, and so arranged as to answer the purpose of a promenade for patients occupying the first-floor wards. There are also certain outbuildings. (See Plates XIII., XIV., and XV.)

Construction  
of hospital  
buildings.

The administrative block contains, 1st, on the ground floor, the medical officer's room, matron's sitting-room, surgery, linen and other closets, kitchen, scullery, servant's mess room, dairy, pantries, watercloset and lavatory; 2nd, on the first floor, five bedrooms, a bath room, and housemaid's closet; 3rd, in the basement a wine and other cellars.

To the east and west of this block runs the main corridor. At its western extremity and on the southern side of it is the small-pox pavilion in which provision is made for six female patients on the ground floor, and six male patients on the first floor. At the southern extremity of these wards two turrets have been built, one at either angle. In one of these turrets are three chambers, namely, a watercloset, a slop sink, and a receptacle for chamber utensils, &c., all three being separated from the ward by a lobby provided with means of cross ventilation. The other turret forms a separate single ward; the same arrangement being carried out on both floors. At the north end of these wards and adjoining the staircase are placed a nurse's room, bath-room, scullery, and lavatory. East of the administrative block, and also on its southern side, is the pavilion containing the enteric-fever wards, this pavilion being in every respect similar to that containing the small-pox wards. Further eastward is the scarlet-fever pavilion which contains wards on both the northern and southern sides of the corridor. To the north is a ward for six female patients on the ground floor, and another for six male patients on the first floor; both wards being provided with nurses' rooms, waterclosets, &c., in a manner somewhat similar to that described with regard to the other wards. On the southern side of the corridor and forming a part of the same pavilion, are four scarlet-fever wards for single patients together with the necessary offices. These latter wards are contained in a one-storied building. Communication between the scarlet-fever pavilion and the administrative block by means of the corridor involves passing through the enteric-fever pavilion.

The whole of these buildings have been so arranged as to allow of future extensions by which the means of isolation may be doubled without in any way interfering with the existing buildings.

Behind the administrative block is a detached building containing wash-houses, laundry, bakehouse, disinfecting chamber, ambulance shed, several store rooms, and a servants' watercloset. At the north-west angle

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Capacity of  
wards.

of the site is the mortuary, which is so fitted up as to serve the purpose of a post-mortem room.

Ventilation.

With regard to the wards themselves they are cheerful, scrupulously clean, and comfortably furnished. They are also well-lighted and well-ventilated, and they are stated to be, even when full, free from any close or offensive odour. All the wards are 14 feet in height. The small-pox and enteric-fever wards are each 38 feet 6 inches in length, and 24 feet 6 inches in width, and have a cubic capacity of 12,194 feet, or somewhat over 2,000 cubic feet for each of the six beds. They are provided with means of cross ventilation by sash windows opening top and bottom and reaching to within 1 foot of the ceiling. Sherringham ventilators are also fitted between the windows just below the level of the ceiling. The scarlet-fever wards are 35 feet in length, by 30 feet in width, and have a cubic capacity of 14,700 feet. The single wards, whether in the turrets or in the scarlet-fever pavilion, measure 12 feet square, and are also 14 feet in height; those in the turrets are provided with windows on three sides, those in the scarlet fever block on one side only.

Windows.

In all the large wards windows are placed at the extreme end of the side walls, dark corners being thus avoided, and the proportion of window space to cubic space in these wards varies from 1 superficial foot to from 65 to 75 cubic feet. All the wards are heated by open fire-places. It was originally intended to supplement this method of heating by hot-water pipes, but this has not been done, and as the fire-places in the large wards are at the extreme end of the room, a difficulty is at times experienced in maintaining an equable ward temperature.

Water-supply.

The building is drained into the main sewers for the borough. All the drains are laid outside the building, and the connexions with them have recently been broken by an intervening air-space. The water supply is from the town service.

Disinfecting  
apparatus.

The disinfecting apparatus in use is "Nelson's Stove." It has at times been found to scorch bedding.

Ambulance.

The "ambulance" is merely an old cloth-lined carriage. It does not admit of a patient lying down in it, and is otherwise not adapted to the use to which it is put.

The nurses are neatly attired in "washing dresses," and they are invariably required to change this attire before leaving the premises.

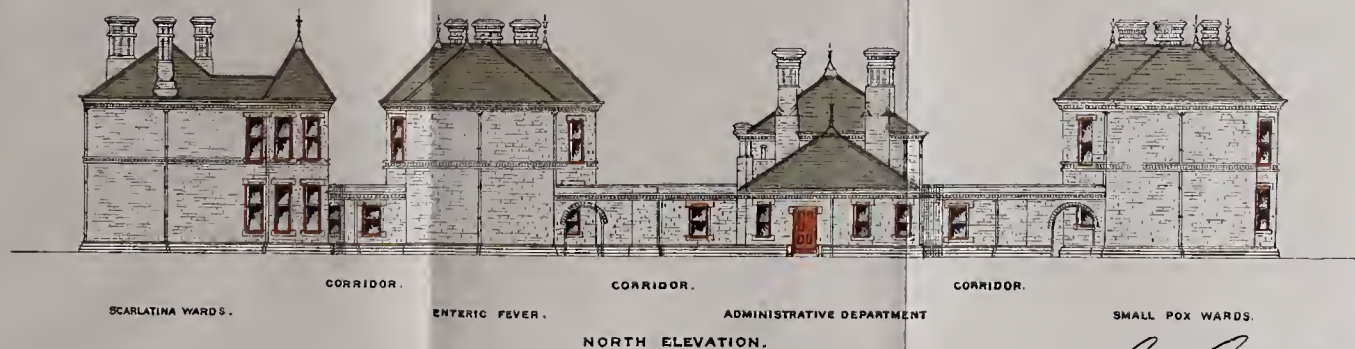
Admission of  
patients.

The hospital was opened in 1874. The number of cases admitted into it in the five years 1875-79, and the diseases under which they suffered, together with the deaths in the borough from those diseases during the same period are shown in the following table:—

	1875.		1876.		1877.		1878.		1879.	
	Deaths in Borough.	Admitted into Hospital.	Deaths in Borough.	Admitted into Hospital.	Deaths in Borough.	Admitted into Hospital.	Deaths in Borough.	Admitted into Hospital.	Deaths in Borough.	Admitted into Hospital.
Small-pox .. ..	36	74	—	—	—	—	—	—	—	—
Typhus fever .. ..	4	4	—	—	—	2	1	—	1	—
Enteric fever .. ..	29	23	11	9	6	14	5	5	4	5
"Fever" or Febricula ..	7	6	7	—	1	2	—	2	3	1
Scarlet fever .. ..	22	4	10	—	4	1	1	—	19	15
Other diseases .. ..	?	2	?	—	?	3	?	—	?	4



# HOSPITAL FOR INFECTIOUS DISEASES, DARLINGTON.



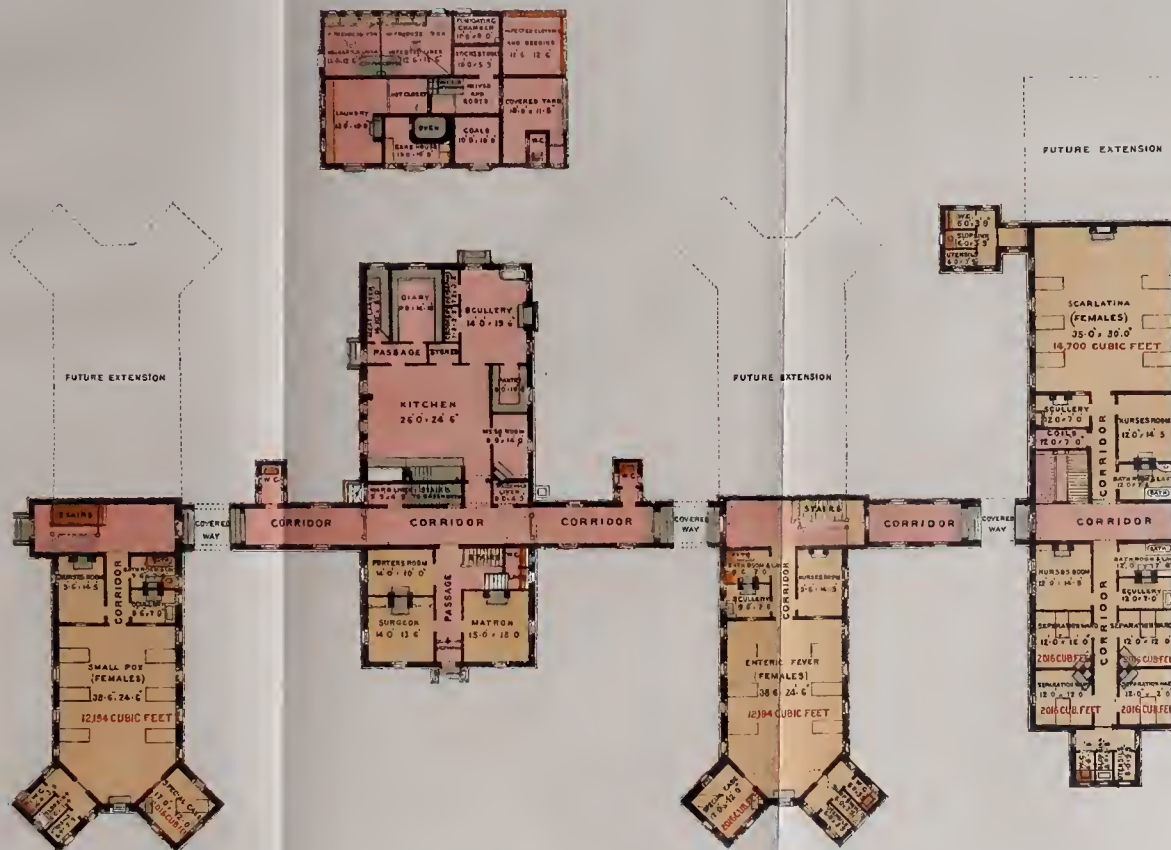
SCALE 32 FEET TO ONE INCH.

*Geo Gordon Hoskins*  
Architect  
Darlington





# HOSPITAL FOR INFECTIOUS DISEASES DARLINGTON.



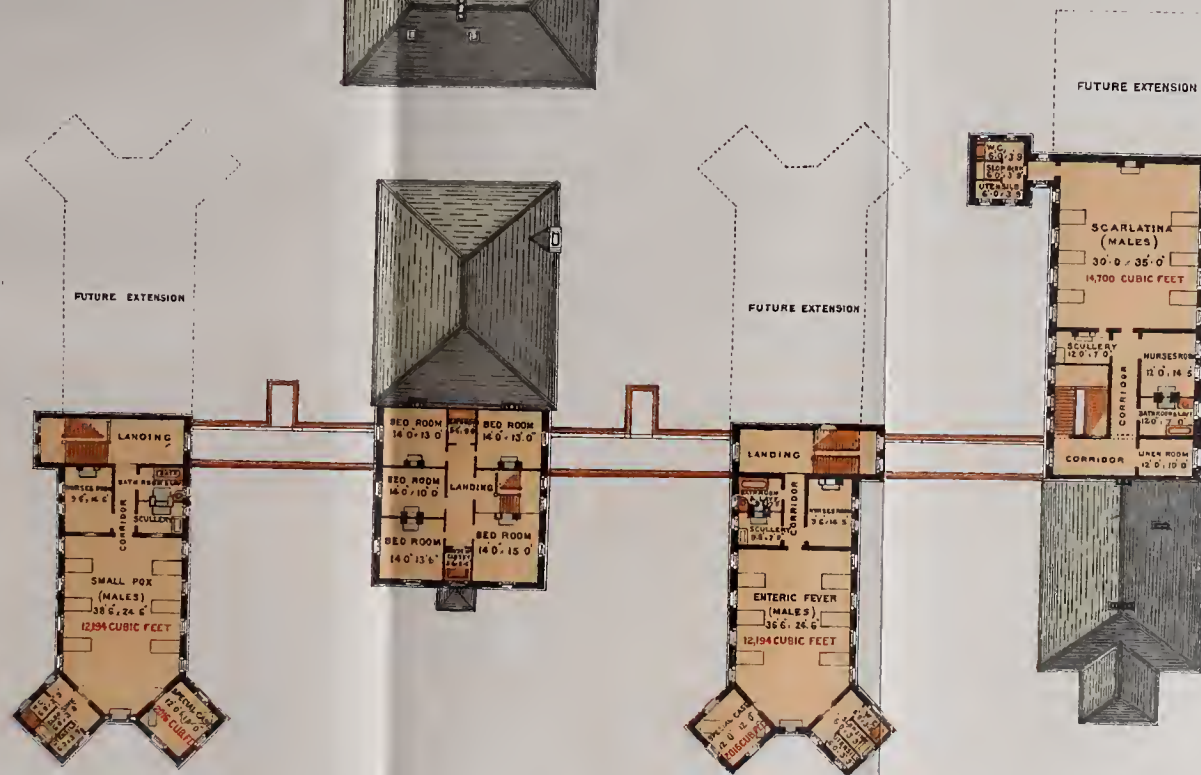
GROUND PLAN  
SCALE 32 FEET TO ONE INCH.

*Geo Gordon Hastings*  
Architect  
Darlington





# HOSPITAL FOR INFECTIOUS DISEASES, DARLINGTON,



FIRST FLOOR AND PART ROOF PLAN

SCALE 32 FEET TO ONE INCH.

*Geo Gordon Hoskins*  
*Architect*  
*Darlington*





The total cost incurred in connexion with the erection of the hospital was 10,745*l.* 5*s.* 10*d.* Of this sum, however, 2,465*l.* 3*s.* 7*d.* was, under an Order of the Local Government Board, handed over to the Urban Sanitary Authority by the Guardians, the amount being derived from the sale of an old workhouse; a further sum of 3,197*l.* 8*s.* 1*d.* was raised by public subscriptions, reducing the actual cost to the Corporation to 5,082*l.* 14*s.* 2*d.*, towards which a sum of 5,000*l.* was borrowed on the security of the rates. The site cost 622*l.* 9*s.* 1*d.*; the buildings 9,251*l.* 13*s.* 5*d.*; and the furniture and fittings 871*l.* 3*s.* 4*d.* The hospital contains 44 beds, a number which at the date of its erection was deemed to afford somewhat over one bed per 1,000 inhabitants in the borough. At that time Darlington was believed to have an increasing population which had already reached about 40,000. Later on came the great depression in the iron trade, and the population probably fell to below 30,000. It is now again on the increase. The total cost incurred in maintaining the hospital, apart from interest on the original outlay, has been as follows:—In 1876 it was 854*l.* 14*s.* 8*d.*; in 1877, 719*l.* 7*s.* 4*d.*; in 1878, 889*l.* 19*s.* 8*d.*; and in 1879, 654*l.* 4*s.* 6*d.* The permanent resident staff consists of a matron, nurse, and assistant nurse, wardmaid, housemaid, laundress, cook, and porter, whose yearly wages amount to 151*l.* 14*s.* 4*d.* The medical officer is a practitioner residing in the town, and for his services at the hospital he receives 125*l.* per annum.

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Cost of con-  
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maintenance.

In diminution of these expenses certain sums have been received from patients or their friends, namely, in 1876, 190*l.* 10*s.*; in 1877, 25*l.* 18*s.*; in 1878, 90*l.* 11*s.* 1*d.*; and in 1879, 22*l.* 13*s.* 6*d.* Under regulations made by the Hospital Committee of the Town Council in February 1875 a sum of 1*l.* 10*s.* per week was to be charged for each patient, or 2*l.* 2*s.* per week if a separate ward was used; children under 12 years of age were also admitted on payment of 10*s.* per week. There were, however, exceptions to these rules. Thus an arrangement was made with the Guardians to admit paupers suffering from infectious disease at 1*l.* 1*s.* per week, and non-paupers could, on a certificate signed either by the Medical Officer of Health or by the Inspector of Nuisances, be admitted at such rates of payment as these officers considered suitable. Difficulties as to payment, however, frequently arose in cases where speedy removal to hospital was called for, and it was also at times ascertained subsequent to recovery that the friends of patients could not pay the sums they were charged. With a view of dealing with these cases, a further resolution was passed in November 1879 to the effect that on the certificate of any duly qualified practitioner the Inspector of Nuisances, whose duty it is to see to the removal of patients, could admit patients at such "rates as he may deem necessary, or free of charge if desirable." This arrangement had been so short a time in operation at the date of my visit that no experience had been gained as to its working. There can, however, be no doubt but that prior to November 1879, the fear of being called upon to pay a comparatively large sum of money for the isolation and treatment of members of their families, had had the effect of preventing the labouring classes from allowing the removal of cases of infectious fevers from their homes, either altogether, or until the disease had spread. It is true that the Authority had never pressed for payment where they felt it would be burdensome, indeed, only about one-third of the patients admitted, including those paid for by the Guardians, have contributed towards their maintenance, &c., but the anticipation that payment might be insisted on is alleged to have had the deterrent effect

Repayments  
to Sanitary  
Authority.

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referred to. As a matter of fact payment is often willingly made, and in one case only has it been insisted on when refused, the case being that of a servant girl sent in by her mistress who resided beyond the limits of the borough.

In addition to cases of infectious fever occurring among other classes, it has already been stated that paupers are admitted. In 1878 two, and in 1879 three such cases were admitted, and since they have never come in in pauper dress, it is the conviction of the medical officer and of the matron that none of the inmates ever have known that some of their companions were paupers, and that the admission of this class has as yet in no way interfered with the utility of the hospital. An arrangement has also been entered into enabling the Rural Sanitary Authority of Darlington to send in patients from their district at the ordinary rate of payment, but they have as yet never acted upon it.

### DEAL PORT SANITARY DISTRICT.

The port sanitary district of Deal forms a part of the Deal, Sandwich, and Walmer Urban Districts, and of the Dover, Eassey, and Thanet Rural Districts.

Character  
of hospital  
building.

The hospital for infectious diseases which was provided in 1876 is of a very imperfect character. It consists of a semi-detached cottage, lying within the urban district of Deal about 200 yards from any other dwellings, excepting only another similar block of two cottages which are close by, and are at present somewhat dilapidated and uninhabited. The cottage immediately adjoining the hospital is used as a store for implements, &c.

The hospital cottage has a small sitting-room and kitchen on the ground floor, and two bedrooms upstairs, the latter being reached by a narrow and steep staircase. One of the bedrooms contains some 900, the other about 780 cubic feet. The former room has a double-sash window and an open fireplace, the latter a casement window and no means of warming. The kitchen, the sitting-room, and bedrooms have been partly furnished by the Port Authority. The cottage stands in a garden about 200 feet long and 35 feet broad; it has no artificial means of drainage; water is procured from a well sunk on the premises into a sandy soil: and a common privy with a cemented tank forms the closet accommodation. On an adjoining piece of land a stove has been constructed for the purposes of disinfection. The compartment in which the infected articles are placed has a single deal cover. Nothing is known as to the heat which can be obtained in it.

Ambulance.

A leather-lined fly, which serves as an ambulance, is kept in the town stone-yard. One patient only has been admitted into the hospital cottage, namely, a sailor who was found to be suffering from small-pox in 1877. Other cases of infectious diseases have at times come under notice amongst sailors, but the patients being destitute they have been removed to the Eassey Union Workhouse.

Isolation of  
patients.

A man and his wife reside at the hospital, rent free, on the understanding that they shall keep it in readiness for the reception of patients, and that they shall quit the premises immediately they are required for the purposes of isolation.

Cost of maintenance, &c.

An annual rent of 15*l.* is paid for the cottage, and a further sum of 2*l.* for the site of the disinfecting stove. Some 10*l.* have been spent in furniture.



## DERBY URBAN SANITARY DISTRICT.

Population in 1881, 80,410. Rateable value (1880), 254,000*l*.

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Dr. Thorne.

Owing to an extensive epidemic of small-pox affecting their districts, a wooden building was erected in 1872 by the Urban Sanitary Authorities of Derby and Litchurch. The hospital was intended as a temporary structure only; it has, however, been retained, and is now the property of the Urban Sanitary Authority of Derby, the Litchurch district having been incorporated with the borough of Derby under the Derby Improvement Act, 1877.

The hospital is situated in an isolated position in a field lying within about 130 yards of a main road leading from the town, and about 1 mile from the centre of the urban district. The soil is clay. The hospital buildings consist of one ward-pavilion, a detached kitchen, &c., a porter's lodge, tenanted by an old man and his wife, a laundry, a block containing certain accommodation for a resident medical officer and for nurses, an ambulance shed holding a leather-lined cab, a deadhouse, and a disinfecting apparatus. Site and soil.

The ward pavilion is a wooden building, the framing of which is covered on the outside only with boarding, the joints being protected by strips of wood. The outside is tarred and the inside limewashed; the roof consists of open slating laid on one inch boarding, and it is louvred at the apex. The pavilion is divided into two wards by a nurse's room, bath room, &c., which occupy the centre; a passage between these apartments affording means of communication between the two wards. Each ward contains 20 beds; the amount of floor space and cubic space per bed being only some 80 square feet, and some 1,400 cubic feet respectively. There are eight double-hung sash windows in each ward—four in each of the opposite walls. Opening out from each of the wards, but not properly separately from them by means of a cross-ventilated lobby, are an ash-closet and a ward sink.

This ward pavilion is in a very dilapidated state; large spaces between the planks admitting wind and rain. At the date of my visit the nurses' room contained a tradesman's wife, who had requested and received permission to come there with a child suffering from scarlet fever. She herself arranged for medical attendance on her child, and for her own and the child's board. By the aid of screens which kept out the wind, the accommodation she had secured was stated to be fairly comfortable. Hospital buildings.

Water and gas are laid on from the town; the drainage at present is into a ditch, but it could be connected with the town system of sewers. Water-supply, sewerage, &c.

The success attending the isolation of small-pox cases in 1872, when 22 cases were admitted, is reported as having been so marked that the Urban Authority determined to retain the temporary buildings they had erected. In 1876 and 1877, eighteen and two cases respectively of the same disease were again admitted, the spread of the disease being in both instances stayed. Notwithstanding the experience thus acquired, however, no attempt has been made to use the hospital for the stay of other diseases than small-pox, and this in face of a prevalence of scarlet fever far more fatal than the small-pox epidemics, and which to use the words of the Medical Officer of Health, had between July 1878 and December 1879 "killed 306 persons." Indeed, beyond the single case of scarlet fever in the hospital at the date of my visit, only one other had been admitted, namely, an infant six months old, who had come in with its mother from a Common Lodging-House. Isolation of small-pox cases.

The reason for making no attempt to deal effectually with scarlet fever by isolation is difficult to understand. In a report made to the Failure to isolate scarlet fever.



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Local Government Board on April 16th, 1879, the Medical Officer of Health states that the hospital "might readily be adapted for the reception of all kinds of infectious cases," and that "there is plenty of room for extension." In another Report, issued at the same date, he informs the Urban Authority that before cases of scarlet fever could be admitted the building would have to undergo certain repairs. It was then ascertained that these repairs would cost some 300*l.*, but it was determined only to spend a sum of 40*l.* with a view of preserving the foundations, the wards themselves being left in an uninhabitable condition. And thus a building which if repaired might well have served the purposes of a hospital during the warmer months of the year was left unused, and the disease continued to spread. This is the more to be regretted, because it is admitted that the greater number of the attacks occurred "in houses occupied by the lower classes," where "huddling together" and overcrowding in "filthy houses" necessarily tended to the spread of a disease which, unless it was of an exceptionally fatal type, must have attacked some 3,600 persons in the 18 months referred to. The history of its prevalence also goes to show how many of the sick were without that proper lodging and accommodation which section 124 of the Public Health Act, 1875, is specially intended to deal with. In thus commenting on the want of action to secure means of isolation in Derby, it is only right to state that in his Report to the Sanitary Authority for 1879, the Medical Officer of Health, whilst referring to isolation as the foremost means for staying the spread of scarlet fever, laid stress on the difficulties which he anticipated would be met with in carrying it out. Especially does he refer to the obstacles which might be encountered in any attempt to induce parents to part with their children. The prominence given to this point led me to visit the Derby Infirmary, where a separate wing exists for infectious diseases, and I found that out of a total of 108 admissions for scarlet fever in the four years 1876-79, as many as 48 had been in children under 10 years of age, 25 of the patients being less than five years old. All these admissions, it should be noted, had been voluntary.

Compulsory  
notification of  
infectious  
diseases.

The Derby Improvement Act, 1879, contains provisions for the compulsory notification of infectious diseases, and considerable activity has already been displayed by the officers of the Sanitary Authority in dealing with infected houses under those provisions. The Act came into operation in January 1880, and in the first quarter of that year 145 cases of scarlet fever, 5 of diphtheria, and 21 of enteric fever were reported to the Authority. The hospital, however, has neither been fitted for use, nor has any other and more permanent provision been contemplated, and with the exception of the case under isolation at the time of my visit, only one patient, the infant above referred to, had been admitted.

Cost of con-  
struction and  
maintenance.

The original cost of the hospital and its various outbuildings to the two Authorities who erected it, was 1,500*l.* The site is rented from the Corporation by the Local Board of Health at a rental of 5*l.* a year. This, together with the necessary repairs, a sum of 8*s.* a week to the resident porter, and expenses for gas, coal, and water, constitute the current expenses when the building is empty.

Disinfecting  
stove.

The Disinfecting Apparatus is that manufactured by Messrs. Fraser Bros. It was erected in 1879, and the public are gradually learning to use it more and more. On several occasions, however, when the thermometer introduced into the centre of the stove has registered 250° Fahr., articles have been scorched; indeed "a dozen set of articles" have had to be made good on this account, by the Urban Sanitary Authority.



A Mortuary and a post-mortem room were erected by the Sanitary Authority in the town of Derby in 1879. It is intended to utilize it for the bodies of persons dying from infectious diseases, but as yet only "inquest cases" has been removed to it.

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Mortuary.  
Derby  
Infirmery  
infectious  
wards.

The Infectious Wards at the Derby Infirmery occupy a detached wing communicating with the main building by means of a corridor to which only a few of the administrative staff have access, and through which a cross current of air is maintained by means of windows whenever the wing is in use. The wing contains two floors and a basement. On each floor are, 1°, two wards which contain 9 beds each; 2°, an "isolation ward" with three beds; and 3°, a "venereal ward." The venereal wards are separated from the remainder of the building by means of a lobby and a door, which is kept locked when any infectious cases are under treatment; they have also separate nurses accommodation. One kitchen, however, serves the purposes of all the wards in this wing. The cubic space per bed in the infectious wards is 1,100 feet. In the basement, which has no communication with the wards, is the hospital laundry. There is no separate laundry for the infectious wards.

Viewed as a hospital for infectious diseases, this wing is in several respects faulty, but small-pox is stated to be the only disease which has spread from it into the general wards. All cases of infectious disease arising in any part of the county are admitted into it, and Mr. C. H. Hough, the Resident Medical Officer, has kindly supplied me with the total cases which came under treatment in the four years 1876-79, discriminating between those received from the borough and those from beyond its limits.

Diseases.	1876.		1877.		1878.		1879.	
	Borough.	Else-where.	Borough.	Else-where.	Borough.	Else-where.	Borough.	Else-where.
Small-pox .. ..	14	3	—	—	—	—	—	—
"Fever" .. ..	32	8	23	18	35	8	14	—
Scarlet fever .. ..	5	3	3	2	13	4	56	—
Totals .. ..	51	14	26	20	48	12	70	24

The Urban Sanitary Authority have no arrangement with the Hospital Authority for the admission of cases of infectious diseases, but any such cases arising in their district can be admitted on the certificate of a registered medical practitioner.

[According to the Report of the Medical Officer of Health for the second quarter of 1880, it appears that after my visit to Derby on June 11th, 1880, the hospital was brought into use, it being deemed fit for the reception of cases during the warm weather. In all 14 fresh cases of scarlet fever were reported to the Sanitary Authority in June. Four of these were removed to the hospital. All four came from different houses. One house was a lodging-house, one a drapery establishment, and the others contained young children, but in no instance did a second attack occur. Following on the cases which were not removed to the hospital, there were 11 fresh attacks due to infection; two of them terminating fatally. Three of the patients isolated were children varying in age from 2½ years to 9 years.]

## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Origin of the  
hospital.

## DOVER URBAN SANITARY DISTRICT.

Population in 1881, 28,486.

## DOVER RURAL SANITARY DISTRICT.

Estimated population, 7,039.

The hospital for infectious diseases at Dover is private property. The occurrence of a somewhat fatal attack of "fever" in what was then one of the worst parts of Dover, led Dr. Astley, with the assistance of a few personal friends, to establish such a hospital some eleven years ago. The step was also carried out with a view of obviating the necessity of erecting "fever wards" at the Dover Hospital, a course which had been proposed, but which was objected to by Dr. Astley and others on the ground that it would probably lead to the spread of infection to the general wards.

Site and soil.

Isolation of  
small-pox  
cases.

Payments by  
Urban  
Sanitary  
Authority.

Hospital  
buildings.

The site which was procured in 1869 consists of about six and a half acres of land lying in an isolated position on the southern slope of the chalk downs, outside the town, but within the Dover Urban District. The first building erected consisted of a double villa-cottage, this style of structure having been determined on in order that the building might be sub-let as to residences, in case the hospital proved a failure. Two cases of scarlet fever were admitted in 1870. In 1871 and 1872 Dover was visited with a severe epidemic of small-pox, and in the eighteen months during which it continued as many as 150 cases were sent by the Town Council into the hospital, supplemented as it was by hospital tents lent to Dr. Astley by the War Office in view of the emergency, and by a day room for convalescents which was then erected. In 1872 the Dover Corporation entered into a definite arrangement with Dr. Astley for the isolation of cases of infectious diseases occurring within their district. They agreed to pay an annual sum of 150*l.* together with a maximum fee of 17*s.* 6*d.* a week for the maintenance and treatment of each patient sent in, provided Dr. Astley on his part undertook to reserve for the purposes of their district a minimum of 12 beds; to receive any additional patients for whom there might at the time be available accommodation; and to erect for the use of the town, a suitable laundry for infected linen, &c., and a disinfecting apparatus. This agreement was entered into for a term of ten years, after the termination of which it is to continue in force from year to year subject to twelve months' notice to terminate it, by either party. In consequence of this agreement, Dr. Astley in 1872 erected, in addition to the laundry, &c., a second villa hospital for the reception of patients.

The hospital buildings now consist of 1<sup>o</sup>, the two houses named; 2<sup>o</sup>, a detached day-room; 3<sup>o</sup>, a detached laundry and disinfecting apparatus; 4<sup>o</sup>, a second laundry with bath room and lavatories annexed; and 5<sup>o</sup>, an ambulance shed.

The two semi-detached villa-cottages erected in 1869 and which now form one house are of brick, and they contain, in addition to a kitchen, scullery, matron's, nurses', and the porter's bedrooms, four rooms for patients. These latter rooms vary in size and contain from somewhat under 1,000 cubic feet to about 1,800 cubic feet; they each hold either two or three beds and are hence obviously overcrowded. The house erected in 1872 is a substantial two storied brick building having 14-inch walls. Externally it resembles a villa residence, and its construction generally is rather that of a dwelling-house than of a hospital. On the ground floor are a sitting-room and a large dining-room for patients, a kitchen, scullery, bath-room, lavatory, &c. On the upper floor are three rooms for patients. One is a ward extending the whole



depth of the building; the ceiling rising with the roof, which is throughout lined with varnished deal. It has one bay-window only, but additional ventilation is secured by means of large louvred openings in the walls. The fireplace is an open one from which warm fresh air passes direct into the ward. This ward contains some 6,600 cubic feet; but it is occupied by as many as nine beds. A second ward, very similarly constructed, contains about 2,700 cubic feet, and holds as many as five beds. A third room, having a capacity of some 2,250 cubic feet, is reserved for a private patient.

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Earth closets are provided throughout the establishments; the drainage is into an unventilated cesspool, which has however no direct communication with the interior of the buildings; and the water is derived from a deep chalk well sunk on the premises, the supply being pumped by an engine into a tank-reservoir from which there is a constant service to all parts of the building.

The disinfecting apparatus is a chamber heated by means of a furnace. As, however, a temperature of 220° Fahr. cannot be attained without risk of damage to the articles contained in the chamber, prolonged exposure of infected articles in the open air is always resorted to after they have been subjected to heat.

Disinfecting  
apparatus.

The ambulance is an old carriage which has been stripped of its linings.

Ambulance

One of the two laundries is reserved for the use of the hospital. The other was constructed as a steam laundry in 1872, under the impression that it would frequently be resorted to for the washing, &c. of linen and other articles, from houses where infectious diseases prevailed. This anticipation has, however, not been realised, and the laundry is now sub-let as a private establishment.

Laundries.

A dairy is also maintained on the hospital premises. Originally only two cows were kept to provide milk for the patients, but when the hospital was empty the milk was sold, and, as a man had to be kept to look after the cows, their number was subsequently gradually increased, and a considerable quantity of milk is now regularly delivered in the town.

Dairy.

The existence of a laundry and a dairy for public purposes at a hospital for infectious diseases must necessarily be regarded with some considerable anxiety. Dr. Astley, however, informs me that he has carefully considered the various sources of danger involved, and he expresses himself as confident that, by reason of the complete isolation of the staff of these two establishments from that of the hospital proper, all risk arising from the proximity of the buildings to each other is avoided.

The history attaching to the establishment of this hospital will account for certain of its defects as a place for the isolation and treatment of cases of infectious diseases. Originally started by Dr. Astley, as a tentative measure, and, as is admitted on all hands, for the benefit of the town of Dover the scheme involved a good deal of risk, and it has never been a financial success. It is still maintained at a considerable annual loss, but notwithstanding this Dr. Astley has never yet made the full charge for the maintenance and treatment of patients which was embodied in his agreement with the Urban Sanitary Authority.

A very similar arrangement to that entered into between Dr. Astley and the Urban Authority also exists between him and the Dover Rural Sanitary Authority with regard to the isolation of cases of infectious diseases occurring in the rural district; an annual fee of 50*l.* being paid by the latter Authority in addition to the charge for the maintenance

Payments  
by Rural  
Sanitary  
Authority.

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On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Admission of paupers.

Advantages following on isolation.

Admission of patients.

(a) from district ;

(b) from rural district.

Incidental uses of hospital.

and treatment of patients. The guardians of the Dover Union also at times send in paupers attacked with infectious diseases, the cost for their maintenance alone being charged. The paupers are kept apart from other patients, and their reception into the hospital is not known to have deterred others from coming in.

Occasionally also, patients suffering from other diseases than the infectious fevers have been admitted. Thus, persons having skin diseases or even surgical affections, have at times been received.

As a means of preventing the spread of infection, both in the Urban and the Rural Districts, this hospital is highly spoken of by Dr. M. K. Robinson, Medical Officer of Health for the East Kent District. Early intimation of the existence of infectious diseases is very generally supplied either to Dr. Robinson or to the Inspectors of Nuisances for their respective districts, and hence isolation can almost invariably be carried out before danger of the spread of infection to others has arisen. Indeed I am assured that, as regards the Urban District, nearly all the cases removed have been first attacks, and that, owing to the isolation of the patients and to the subsequent disinfection of the premises from which they were removed, no subsequent attacks have occurred.

The three principal diseases which have been admitted into the hospital are scarlet fever, small-pox, and "fever," which has almost always been enteric fever. During the three years, 1877-79, the total number of all infectious fevers received from the Urban District has been 54. Three of these have been cases of measles; one a case of diphtheria; the remainder are shown in the Table below in which they may be compared with the total deaths of the same causes in the district.

			Scarlet Fever.		Small-pox.		"Fever."	
			Deaths in Urban District.	Received in Hospital from Urban District.	Deaths in Urban District.	Received in Hospital from Urban District.	Deaths in Urban District.	Received in Hospital from Urban District.
1877	...	...	11	20	0	5	6	3
1878	...	...	3	10	0	0	3	1
1879	...	...	4	7	0	2	11	2

The total number of cases received from the Rural District has been 15. Three were cases of measles. The remainder are shown in the annexed table in connexion with the deaths from the same causes.

			Scarlet Fever.		Small-pox.		"Fever."	
			Deaths in Rural District.	Received in Hospital from Rural District.	Deaths in Rural District.	Received in Hospital from Rural District.	Deaths in Rural District.	Received in Hospital from Rural District.
1877	...	...	2	3	0	0	1	1
1878	...	...	0	1	1	1	0	0
1879	...	...	0	5	0	1	1	6

Apart, however, from the reception of the sick, the hospital has been of great service in temporarily receiving persons who, coming from



infected houses, have desired to remain away from their homes until both by lapse of time and by the "disinfection" of their clothing, they were considered free from the risk of conveying infection. Nurses returning to the Dover Nursing Institute after attendance on infectious cases, are always received into the hospital for the purposes indicated, and private persons also avail themselves of the same privilege.

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A large number of infected articles are also annually dealt with in the disinfecting stove, and subsequently washed and subjected to prolonged exposure in the open air, the charge made for this, including carriage to and fro, amounting to 12s. 6d. for each set of articles requiring the heating of the stove. The Urban Sanitary Authority have in this way expended a sum of somewhat over 56l. in the three years 1877-79; some 12l. however having been repaid to them by the more well-to-do of the owners of the infected articles.

Disinfection.

In one instance proceedings have been taken by the Urban Sanitary Authority under section 124 of the Public Health Act, 1875. The case was one in which several children affected with measles occupied an overcrowded dwelling. In this case the mother was allowed to accompany her sick children to the hospital, a practice which is often adopted when young children are in question, the parent remaining in hospital either a few days or permanently according to the circumstances. Where the parents are poor, the Authority have paid for the mother as for a patient, and in many instances the mothers finding within two or three days of their arrival that their children were happy, have, after their clothing has been stoved, returned to their homes.

Section 124,  
Public Health  
Act, 1875.

No proceedings have ever been taken under section 132 of the Public Health Act, 1875, and not only so, but the Medical Officer of Health and the Inspector of Nuisances have instructions which enable them in cases of poverty, to give such assurances as to the remission of the fees for maintenance and medical care in the hospital, that the question of payment is not known, even in a single instance, to have hindered removal to the hospital. Indeed I am assured that the only objection to removal to the hospital which has not, except in the one case of compulsory proceedings above referred to, been successfully overcome, has been the fear which has resulted from patients having, in a few isolated instances, and doubtless owing to the defects in construction adverted to, contracted in the hospital some other infectious disease than that for which they themselves entered.

Section 132,  
Public Health  
Act, 1875.

It should be added that the agreement between the Urban Authority and Dr. Astley, was drawn up several years prior to the appointment of the present Medical Officer of Health, and that it contains a clause to the effect that no appointment of any such officer which should be made at any time should "extend to empower the said officer or person" to have any control whatever, or to enable him to interfere with the "conduct or management of the said hospital or laundry, or with the" sick persons," except by the express permission of the proprietor. In accordance with this agreement, Dr. Astley, whilst opening the hospital to the visits of any medical practitioner, reserves to himself sole medical and administrative charge.

General and  
medical ad-  
ministration.

#### FOLKESTONE URBAN SANITARY DISTRICT.

Population, 18,717. Rateable value, 98,400l.

Folkestone has two hospitals for infectious diseases. One is for the reception of small-pox only, the second for other infectious diseases.

Construction  
of small-pox  
hospital.

I.—The small-pox hospital was constructed in 1876, but the town being at that time and for several consecutive years free from that



disease, it was not brought into use until June 1879, when a case was imported. Owing to means of isolation being at once available no spread of the disease took place. This hospital occupies quite an isolated position on the southern slope of the chalk downs to the north of Folkestone, about a mile out of the town; it being built on the now levelled site of what was formerly a chalk-pit cut into the hill-side. It is a double-plank building, having 6-inch walls filled in with sawdust, and resting on brick foundation. The chimney flues are also of brick. The roof is of corrugated iron, lined with match boarding. It contains two wards, separated in the centre by an entrance lobby, and a room for the medical attendant. Through the latter, access is had to an administrative block standing at right angles to the main building and containing a kitchen, scullery, bedroom, pantry, and wash-house. An outbuilding also contains a coal-house, dead-house, and a "fumigating chamber." (See Plates XVI., XVII.)

The two wards are alike. They each contain 253 square feet and 3,036 cubic feet, and hold two beds. Both wards have four double-hung sash windows, two on either side, with a sash above, hung to the transom and opening inwards; they are further provided with air gates just above the floor level, and with ventilating shafts opening above the roof and fitted with Archimedean screws; they are heated by means of stoves; and are neatly furnished. A well-ventilated earth-closet and a ward-sink are built out at the end of each ward, from which they are separated by means of a cross-ventilated lobby. The ordinary water-supply is from a rain-tank, but when necessary a further supply from the town mains is sent up in a water-cart. The drainage is into a cesspool in the chalk, with which the scullery appears to be in unbroken communication.

A man who is employed by the Urban Authority in repairing roads, resides here with his wife rent free. When the hospital contains patients the wife acts as nurse, and the man, who still retains his wages, discontinues his ordinary work and renders such assistance as is necessary.

The site belongs to the Earl of Radnor, by whom it is granted rent free. The buildings cost 400*l.*, the furniture and fittings 40*l.*

Erection of  
second hospital  
for infectious  
diseases.

Site and soil.

II.—A second hospital for infectious diseases other than small-pox was erected in 1878, and is locally known as "The Sanatorium." The site is a piece of land of 1 acre in extent, lying within the borough limits, but about a quarter of a mile out of the town. It is oblong in shape, its two larger sides lying respectively north-east and south-west. The soil is clay; the Sanitary Authority having failed to procure a site on either the green sand or the chalk, within a reasonable distance of the town. To the south-west of the site are market gardens and the sea; to the north-west are some brick-kilns and the South-Eastern Railway Station; to the north-east are fields, and to the south-west are some half-dozen cottages lying 120 feet from the hospital grounds and over 200 feet from the nearest hospital buildings. As yet the site is only enclosed by iron railings.

Hospital build-  
ings.

The hospital buildings are from the plans of Mr. W. E. Springall, who in 1878 was borough surveyor for Folkestone. The original plans show a central administrative block communicating by means of covered ways with three pavilions, one to the south-west, which consists of separate private wards and a nurse's room, and the two others to the south-east and north-west containing each two wards separated in the centre by a nurse's room, entrance lobby, &c. As yet, however, only the first of these pavilions, together with the administrative block and certain out-



[illegible]

W. E. SPRINGALL  
BORO' SURVEYOR

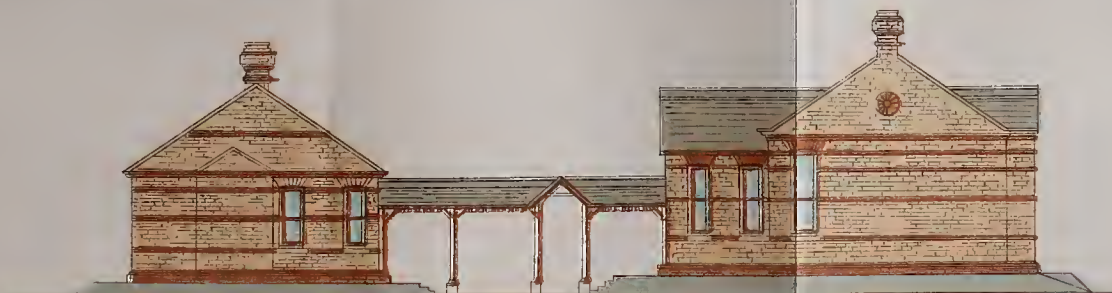




# SANATORIUM FOR THE CORPORATION OF THE BOROUGH OF FOLKESTONE.

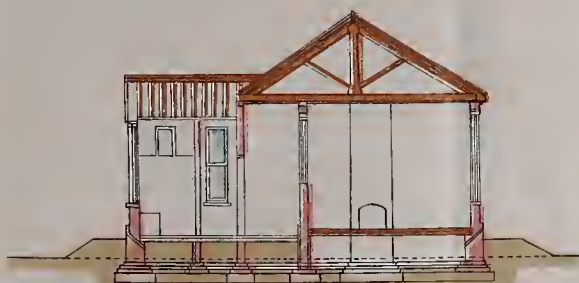


ELEVATION OF CENTRE BLOCK.



ELEVATION OF ADMINISR BLOCK.

END ELEVATION OF CENTRE BLOCK.



SECTION THRO' CENTRE BLOCK.



ELEVATION OF ADMINISR BLOCK.

SCALE 16 FEET TO 1 INCH.

W. E. SPRINGALL,  
BORO' SURVEYOR.





buildings have been built; the erection of the two other pavilions being temporarily deferred.

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The existing buildings stand on terraces artificially raised above the surrounding ground, and are neatly and substantially constructed of stock brick, with red brick ornamentation and Bath stone sills. The roof is tiled. All external walls are 14 inches thick.

The administrative block lies to the north-east of the site. It is divided into two portions by means of a well-ventilated passage, and it contains a kitchen, scullery, a bedroom for the care-taker and an extra one for a nurse, a pantry, surgery, storerooms, and an efficiently-ventilated watercloset, which is separated from the main building by means of a lobby admitting of cross-ventilation. Continuous with the passage is a covered way, open at the sides and leading to the ward-pavilion. This pavilion, which to the front has a south-westerly aspect, faces the sea, and consists of seven separate apartments all opening on to a corridor. The two end wards project beyond the others in the direction of the administrative block at the rear, and the recess thus formed by the remaining apartments constitutes a corridor open on one side and under the same continuous roof as the wards. On the side opposite to the wards are three small detached buildings; the central one has a passage continuous with the covered way from the administrative block, and also contains a bath room, fitted with a moveable bath, a ward-sink, and lavatories; the other two contain waterclosets and slop-sinks. Six of the apartments in the pavilion are wards, the central one being reserved for nurses. The two end wards have a floor space of 24 feet  $\times$  18 feet=432 square feet, and a height of 14 feet; or a total capacity of 6,048 cubic feet. The four smaller wards are 17 feet square=289 square feet and 14 feet in height; thus having a capacity of 4,046 cubic feet. A small portion of all these wards is, however, cut off by the construction inside, and to a height of some 6 feet, of a lobby, so that the wards should not open directly into the outer air. The ward doors do not face the doors into the corridor without, and hence a low sliding door has been constructed in that part of each lobby which faces the corridor, and through this a bath can be wheeled into the ward. The two larger wards are to receive three beds each, the others two beds; each bed will thus have somewhat under 140 feet of floor-space, and nearly 2,000 cubic feet. As yet, however, the hospital is only partly furnished. All the wards are provided with three double-hung sash windows to the south-west or front, and two in the opposite wall in which also the door is placed; thus affording means of cross-ventilation. The two larger wards have an additional window, one at each end of the pavilion. In these larger wards there is, above the double-hung sashes, another sash opening towards the ceiling; in the smaller wards these latter sashes are only situated in the front windows, there being an air brick above those at the back. In all the wards there are air-brick openings just above the floor level, Arnot's ventilators near the ceiling, and ventilating shafts fitted with revolving screws opening above the roof; the larger wards are also fitted with "Tobin" tubes. The total amount of window surface in the larger wards is nearly 146 square feet, or at the rate of 1 square foot to about 42 cubic feet; in the smaller ones it amounts to 100 square feet, or at the rate of 1 square foot to about every 40 cubic feet. In some of the wards there are stoves, in others open fireplaces.

In a detached block are a wash-house, a chamber in which infected articles are subjected to the fumes of burning sulphur, a dead-house, and an ambulance shed.

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Ambulance.  
  
Water-supply  
and drainage.

Pending the construction of a proper ambulance, an old brougham stripped of its lining is used for the removal of the sick. This removal is always effected under the personal superintendence of the borough surveyor, who also supervises the “fumigation” of the conveyance after its return to the hospital.

The hospital buildings are provided with water from a well which is situated on the premises, and which is sunk into the green sand below the gault, the supply being pumped into a tank over the administrative block, from which a constant service is maintained. The drainage is by means of well-ventilated drains into the town sewers, there being no direct communication between them and the interior of the buildings.

The grounds are neatly laid out, partly as flower, partly as vegetable garden.

Admission  
of patients.

Up to the date of my visit to the hospital only eight cases had been admitted. Five, suffering from scarlet fever, were admitted in 1879, and three, namely, two suffering from enteric fever and one from scarlet fever, in 1880. Three of the patients were the children of gentlemen, one a lady’s companion, one a tradesman’s assistant, one a domestic servant, and two the children of a laundress. Of the two latter patients, the second appears to have contracted the disease by visiting the former whilst in the hospital; in the other cases, however, no further attacks followed the removal of the patients. As yet no rules have been laid down as to general administration or as to the admission of visitors.

Visitors.

The following are the total deaths from infectious diseases registered in the urban district, and the admissions to the two hospitals in the two years 1879-80:—

Diseases.	1879.		1880.	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
Small-pox ... ..	1	1	0	0
Scarlet fever ... ..	0	5	0	1
Diphtheria ... ..	1	0	0	0
Enteric fever ... ..	8	0	19	2

Payments by  
patients, &c.

Pending the compilation of a code of regulations, all patients are expected to pay 10s. 6d. a week for the accommodation given at the hospital, and they have to make their own arrangements as to board, nursing, and medical attendance. In the case of the laundress’s children, however, the Sanitary Authority, with a view of securing immediate isolation, remitted the usual fee for the use of the hospital, and also provided board and nursing. No action has as yet been found necessary under sections 124 to 132 of the Public Health Act, 1875.

The hospital is in charge of one of the employés of the Urban Authority, who resides there rent free with his wife. He is also provided with fuel and lights. When any patients are under treatment he still receives his ordinary wages of 15s. a week, but both he and his wife are then expected to give their entire services to the hospital.

Cost of  
construction.

The piece of land on which the “Sanatorium” is built cost 250l., the erection of the existing buildings, including the laying out of land, &c., amounted to 2,700l., and a further sum of 100l. has been expended on furniture and fittings.



## GOOLE URBAN SANITARY DISTRICT.

Population in 1881, 10,339. Rateable value, 27,496*l*.

## GOOLE RURAL SANITARY DISTRICT.

Population in 1881, 9,203. Rateable value, 69,643*l*.

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Transference of workhouse hospital to sanitary authorities.

The hospital for infectious diseases belonging to the Goole Urban and Rural Sanitary Districts is a building which formerly constituted the workhouse infectious hospital, and which was, with the sanction of the Local Government Board, let by the guardians in January 1876 to the rural sanitary authority, whose district was then co-terminus with that of the Goole Union. The arrangement was, however, only deemed to be of a temporary character. Later on the town of Goole was formed into an urban district, and the hospital became vested in the urban sanitary authority; the guardians as a poor law and a rural sanitary authority having the right to send in patients on payment of a proportional share of the maintenance expenses.

The workhouse buildings lie just outside the inhabited portion of the town of Goole, but within the urban district, and they consist in the main of three parallel blocks facing north and south. The workhouse itself adjoins the main road; behind this lies the workhouse infirmary, and still further to the rear, and at a distance of 160 feet from the infirmary, is the hospital for infectious diseases, which stands in a separate garden of somewhat irregular shape, and measuring 258 feet long by an average of 110 feet wide. This garden is enclosed by a substantial wall 8 feet high, and it is well isolated from neighbouring dwelling-houses, but the only access to it is by means of a roadway which passes through the workhouse grounds by the side of the other workhouse buildings.

The hospital is a substantial two-storied brick building. On the ground floor the central portion of the building is occupied by two entrance lobbies, one on either side of a kitchen and a nurse's room; there is also a pantry and a larder behind, both being approached from without. On either side of these central administrative rooms, and each opening into one of the entrance halls, is a ward 24 feet  $\times$  20 feet  $\times$  12 feet. Both these wards have two double-hung sash windows in each of the opposite side walls, with additional means of ventilation by means of openings above the floor level and in the ceiling; the openings in the latter communicating with the outer air by means of the space beneath the floor of the upper story. They are each warmed by one open fireplace, and they are provided with waterclosets, themselves imperfectly ventilated, and each communicating with the wards by means of a lobby which has a window in one side-wall only, and contains a lavatory, which is in direct communication with the drains. The result, as might have been anticipated, is that offensive effluvia find their way into the wards. At each end of the building, but having separate means of entrance from without, is another ward measuring 20 feet  $\times$  18 feet  $\times$  12 feet, and in every essential respect resembling those already described. On the first floor a nurse's room, and two bath rooms containing fixed baths occupy the centre of the building, and on either side of these are wards resembling those on the ground floor both in dimensions and means of access. At the head of each of the separate staircases for the upstairs wards at the two ends of the building is a bath room. There are thus eight wards, capable of containing some 20 patients, and there is accommodation, so far as the wards are concerned, for the simultaneous treatment of two diseases in both sexes. The administrative accommodation is, however, quite inadequate to the requirements of the hospital.

Hospital buildings.

The outbuildings, which are to the rear of, and in very close proximity to the ward building, are in two groups. One contains a wash-house, a disinfecting stove; ambulance, &c.

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On the Use and Influence of Hospitals for Infectious Diseases, by Dr Thorne.

Water-supply and Drainage.

Admission of patients from—

coal store, and a disinfecting room; the other a mortuary and an ambulance house. The disinfecting room is fitted with a Nelson's stove, which is heated by gas. It was procured some five years since, but it has been found to scorch and burn articles when a temperature of only 120° F. is indicated by the thermometer, and its use has for two years been abandoned. The ambulance is of very imperfect construction; it contains no stretcher for the patient and no seat for a nurse or attendant inside.

Water is pumped from a well on the workhouse grounds into a large tank on the hospital roof. The drains pass into the town sewers, with which they are in direct communication; they are also imperfectly ventilated and otherwise defective. [Some of these defects have since been remedied.]

The use to which the hospital has been put by the authorities both of the urban and the rural sanitary districts will be seen from the two following tables, which give the total deaths registered in, and the number of cases admitted into the hospital from each district from the diseases specified.

*Urban Sanitary District of Goole.*

(a) the urban district;

Date.	Small-pox.		Scarlet Fever.		"Fever."		Other Diseases	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1876 ... ..	4	13	—	—	9	8	?	3
1877 ... ..	—	1	3	—	3	2	?	1
1878 ... ..	—	—	5	3	13	8	?	2
1879 ... ..	—	—	18	2	2	3	?	—
1880 ... ..	—	—	5	3	11	24	?	—
1876-80 ... ..	4	14	31	8	38	45	?	6

*Rural Sanitary District of Goole.*

(b) the rural district.

Date.	Small-pox.		Scarlet Fever.		"Fever."		Other Diseases	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1876 ... ..	—	2	2	—	5	2	?	4
1877 ... ..	—	—	6	—	2	—	?	—
1878 ... ..	—	—	7	—	2	—	?	—
1879 ... ..	—	—	12	—	—	—	?	—
1880 ... ..	—	—	—	—	12	—	?	—
1876-80 ... ..	—	2	27	—	21	2	?	4



In the urban district the isolation of cases of small-pox has in most cases been attended with but little difficulty, and owing mainly to a voluntary notification of infectious diseases, a noteworthy proportion of the cases "fever" have also been removed to hospital. The number of admissions from scarlet fever has, however, been extremely small, and it is freely admitted that there is a somewhat general prejudice against the hospital. How far this is due to its position with respect to the workhouse cannot easily be estimated, but it certainly has weight, and both Dr. H. F. Parsons, formerly medical officer of health to the two districts, and Dr. J. M. Wilson, the present officer, have constantly advised that, with a view of lessening this objection, one of the unfulfilled conditions subject to which the Local Government Board sanctioned the transfer of the building from the guardians, namely the construction of a separate roadway and entrance, should be carried out. Dr. Wilson, referring to this subject in his annual report for 1879, says, "the hospital will then be quite free from any suspicion of pauperism, which is a ready excuse used against allowing cases to be sent there." It is stated that all the residents in the urban district are fully aware that the hospital is no longer a part of the workhouse, but notwithstanding this none but the poorer of the wage-earning classes and domestic servants can be induced to enter it.

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Use of hospital by urban authority.

The absence of any proper administration must also affect the credit and use of the hospital. With reference to this subject Dr. Parsons in a report to the Goole urban authority, July 11th, 1879, after referring to the necessity of a new entrance and roadway, wrote—"The other want is that of a defined and responsible management. The hospital was equipped by me under your orders, and its management rested with me until May 1877, when . . . it was taken out of my hands and placed in those of a hospital committee of your board. In April 1878 the hospital committee lapsed, and was not re-appointed, and since then there has been no one specially responsible for its management." This condition of things still existed at the date of my visit in 1881, and apart from a resident nurse who followed the directions of the several medical men who were, except as regards paupers, selected by the patients themselves, no one accepted any responsibility for the sanitary condition or management of the establishment. So also no medical practitioner has been appointed to attend such non-pauper patients as are unable to retain the services of their ordinary medical attendants.

Faulty administration.

As regards the rural district the hospital has obviously been all but useless, and this is the more to be regretted because many of the medical practitioners have in this, as in the urban district, voluntarily notified the existence of such cases of infectious disease as have come under their notice. Thus in the three years, 1876-78, as many as 180 cases of scarlet fever, and 26 of "fever" were reported to the medical officer of health. Two cases of "fever" were, however, the only ones removed to the hospital. The circumstances already referred to as probably affecting isolation must also be considered in connexion with the rural district: indeed the association of the building with pauperism has, especially in the early history of the hospital, been raised as an objection against entering it. But other causes have also been in operation. Thus the distance intervening between several of the more populous localities within the district and the hospital has hindered isolation. Only two of the more populous parishes lie within two miles of the building, whereas others, such as Rawcliffe which in 1871 had a population of 1646, Snaith with a population of 991, and Luddington with a population of 775 are respectively four and eight and fourteen

Use of hospital by rural authority.



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miles distant. Medical practitioners living in the rural district are also unable to continue their attendance on patients removed from the more distant parts of the district, and the patients have hence either, at their own cost, to call in the services of other practitioners in Goole, or to be attended by the workhouse medical officer.

Four paupers only have been admitted into the hospital since its transfer to the sanitary authorities; they have all been attended by the medical officer to the workhouse. Three of them were children, who during the period of their isolation wore a pauper uniform; but as no other patients were then under treatment this circumstance is not believed in any way to have affected the use of the hospital.

Public Health  
Act, 1875, s. 124.

In one instance, in 1876, a magistrate's order was procured for the removal of a child suffering from scarlet fever from an overcrowded dwelling at Rawcliffe, in the rural sanitary district, but the removal was resisted by the parents. The father was subsequently summoned for wilfully disobeying and obstructing the execution of the order, but as it was the first case which had arisen in the district he was dismissed with a caution on payment of costs.

Public Health  
Act, 1875, s. 132.

A charge varying from 5*s.* to 7*s.* 6*d.* per week is supposed to be made as regards each patient, but with the exception of sums received from the guardians for the isolation of paupers nothing has been received for several years, and no effort is made either under the Public Health Act or otherwise to secure payment.

Cost of  
maintenance.

The cost of maintenance is entirely borne by the urban sanitary authority, and neither they nor the rural authority pay any rent to the guardians, who in return for the use of the building only require that paupers needing isolation shall at any time be admitted.

#### GRANTHAM URBAN SANITARY DISTRICT.

Population, 16,886. Rateable value, 58,620*l.* 4*s.* 9*d.*

Outbreak of  
scarlet fever  
leading to  
erection of  
hospital tents.

In June 1878, scarlet fever became prevalent in the Urban Sanitary Districts of Grantham, Spittlegate, and Little Gonerby, which since 1879 have been united to form the present borough of Grantham, and also in part of the Grantham Rural District. The disease was not heard of by Dr. A. Ashby, the Medical Officer of Health for the Grantham, Newark, and Sleaford Combined District, until it had already assumed the proportions of a somewhat large outbreak, and even then the absence of any available means of isolation prevented any such immediate action being taken as could prevent its further spread. With a view, however, of controlling the limits of the epidemic, Dr. Ashby, on the 25th of June, procured the assent of the three Urban Authorities to the erection of hospital tents, and two days later the Rural Sanitary Authority expressed their willingness to join the combination effected for that purpose.

From an account of the hospital encampment, which was published by Dr. Ashby,\* and from information given to me on the occasion of my visit to Grantham, it appears that the use of a grass field, six acres in extent and occupying an elevated position outside and to the west of the populated part of the existing borough, was procured without difficulty for a sum of 10*l.* This field adjoined a main road, and it admitted of the erection of the tents at a distance of between 300 and 400 yards from the nearest house and from the roadway.

Hospital tents.

Two hospital marquees, resembling those used at Newark in 1877 (see report on Newark Urban Sanitary District, page 193), were ordered

\* See "The Practitioner," August 1879 : Macmillan & Co.



from Messrs. Piggott Brothers, of 59, Bishopsgate Without, E.C., on June 25th, and they were pitched on June 28th. A small tent for a male attendant, a second one to serve as a mortuary, and a third for convalescents, were also put up at the same time. One wooden building containing a wash-house, kitchen, nurses' room, store-room, dispensary, and sleeping accommodation for females; and a second detached wooden structure, containing earth-closets, were commenced on June 28th, and, excepting the wash-house, were completed within two days.

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By June 30th one marquee was ready for occupation, and six patients were received into it; next day the floor of the other marquee was completed, and it also was furnished and occupied.

Owing to the time of the year no means were needed for warming the tents. Water was daily brought from the town in a tank-cart; the drainage was disposed of by sub-irrigation through common tile pipes, and the contents of the pails in the earth-closets were daily trenched into the ground. Buckets were also kept filled with water in case of fire.

Water-supply  
drainage, &c.

The two marquees being soon fully occupied, two more were hired from the Newark Urban Authority at 1*l.* per tent. One was ready for occupation on July 4th the other on July 15th. On July 17th two "Netten-Radcliffe" hospital tents arrived from Newark, two more on the 22nd, and a fifth marquee was procured from Messrs. Piggott Brothers, on August 1st; the total tent accommodation at this date amounting to five hospital marquees, four Netten-Radcliffe tents, one tent for convalescents, and two small tents for administrative and other purposes. With a view to a more efficient supervision by the nurses, three of the marquees were placed end to end and opened up so as to form one continuous ward, and the same plan was adopted with regard to two of the Netten-Radcliffe tents, the canvas walls at the contiguous ends being so looped up that they could when necessary be let down again, so as to divide the wall into sections.

Owing to the absence of any disinfecting apparatus, articles of clothing were as a rule steeped in a disinfecting fluid, and then subjected to prolonged exposure to the air; and the contents of the beds, bolsters, &c., which consisted of finely chopped straw, were burnt. An old cab had to serve as an ambulance.

Disinfection,  
&c.

The general administration of the hospital was in the hands of Dr. Ashby, and a medical practitioner resident in Grantham attended the patients. Two trained nurses from Lincoln, aided by two mothers of the patients, formed the nursing staff; there were also one male and three female attendants.

Administra-  
tion.

The number of patients admitted during the eight weeks from July 5th to the 23rd of August, when the epidemic ceased, was 66, and of this number 44 were received from within the present borough limits, and 22 from the rural district.

Admission of  
patients.

*Admissions to the Hospital Tents.*

Week ending July	5th	-	-	-	-	-	13
"	12th	-	-	-	-	-	5
"	19th	-	-	-	-	-	12
"	26th	-	-	-	-	-	12
"	August 2nd	-	-	-	-	-	11
"	9th	-	-	-	-	-	7
"	16th	-	-	-	-	-	5
"	23rd	-	-	-	-	-	1
							66

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The ages of the patients admitted are shown in the following Table; the number at 10 years or under amounting to 74 per cent. of the total admissions. In either two or three instances mothers were admitted with their children.

One year	-	-	-	-	-	-	-	-	1
Two years	-	-	-	-	-	-	-	-	6
Three „	-	-	-	-	-	-	-	-	2
Four „	-	-	-	-	-	-	-	-	4
Five „	-	-	-	-	-	-	-	-	8
Six „	-	-	-	-	-	-	-	-	7
Seven „	-	-	-	-	-	-	-	-	5
Eight „	-	-	-	-	-	-	-	-	3
Nine „	-	-	-	-	-	-	-	-	8
Ten „	-	-	-	-	-	-	-	-	5
									—
									49
Over ten years -	-	-	-	-	-	-	-	-	17
									—
									66
									—

Results of  
isolation in  
the tents.

Any comparison between the results of the treatment of patients in their own homes and in the tents was found impossible, because no correct estimate could be formed as to the total number of cases which occurred. Of the 66 patients admitted into the tents, six died, the rate of mortality being 9·09 per cent., and Dr. Ashby expresses the conviction that this mortality would have been much greater had it not been for removal to the tents. He also reported :—

- 1°. That no case of dropsy arose during treatment in the tents.
- 2°. That several cases of dropsy which were sent in recovered.
- 3°. That some very bad cases recovered in the tents “which apparently must have ended fatally if the patients had remained in their homes.”

The influence of the hospital encampment in staying the spread of the epidemic was very marked, indeed, within a week of the hospital being in full working order at the end of July, the number of cases began to diminish, and a fortnight later the outbreak had ceased. Dr. Ashby also in his published account of the outbreak cites numerous instances to show how, by the removal of the first patients attacked, the spread of the disease was stayed in the localities from which they were removed. He however adds :—“Since the hospital was of a temporary nature, and was not erected until an epidemic threatened, it may be premised that the disease had become pretty general before it was ready for occupation; hence it is somewhat difficult to clearly define the influence which the isolation of the sick exercised over its spread. I am fully convinced, however, that it was effectual in checking it.”

According to the same report Dr. Ashby states that in the majority of the cases in which parents were asked to send their children to the hospital tents they consented, and such objections as were raised were, on several occasions, overcome by inducing the parents to visit the tents, in one instance where a boy occupied an ill-ventilated and overcrowded dwelling it was found necessary to take preliminary steps with a view of procuring a magistrate’s order for the compulsory removal of the patient. The magistrate having, however, himself visited the house, the parents consented to the removal.

In no instance was any demand made on patients or their friends for maintenance, &c, whilst in hospital.

Public Health  
Act, 1875, s. 124.



Referring to the influence of the hospital on the neighbourhood in which it was situated Dr. Ashby writes:—"That the hospital was not the means of spreading infection in the least degree is evident from the facts that there were no cases of the disease in any of the houses nearest to it, and that there was relatively much less of it in Little Gonerby," in which district the hospital stood "than in any other part of the town, and this, notwithstanding the tents were situated in it, and every patient had to be conveyed through it on the way to them."

The cost of the hospital was divided between the contributing authorities in the ratio of the population of the districts from which the patients were received, the total expenses involved in its construction and maintenance being as follows:—

	£	s.	d.
Urban Sanitary Authority of Grantham	-	-	249 10 6
Urban Sanitary Authority of Spittlegate	-	-	286 13 1
Urban Sanitary Authority of Little Gonerby-	-	-	140 10 0
Rural Sanitary Authority of Grantham	-	-	109 0 0
			<hr/>
	£786	3	7

A small detached "fever hospital" stands in the grounds of the cottage hospital, known as the Grantham General Hospital. It contains two wards besides separate rooms upstairs, and is adapted to receive five patients. Two diseases could not, however, be with safety treated in it at the same time.

#### HARTLEPOOL PORT SANITARY DISTRICT.

A hospital for the isolation of cases of infectious diseases was built for the purposes of the Port Sanitary District of Hartlepool in 1877 from the design and under the superintendence of Mr. George Scott, Town Surveyor for the West Hartlepool Urban District.

The hospital is situated on a bed of blown sand, in an isolated position just beyond the Jewish Cemetery, some 2½ miles by road from the Docks and about 100 yards from the sea. The site measures 260 feet by 85 feet, and it is enclosed by a wall 8 feet high. The building is a one-storied substantial brick structure, having its external walls 14 inches thick. Fronting the road is the principal entrance together with a kitchen and a bedroom intended for the care-taker and his wife, together with a pantry and a closet for stores. From this part of the building a passage, having a separate entrance from without, leads to two wards, to a bath-room and lavatory, and also to a yard containing two privies, one at either end of a common midden. The midden is roofed, but is sunk below the yard level, and the privies are so situated with regard to it as not to admit of the proper mingling of ashes with the excreta. The principal ward is 28 feet in length, 16 feet in breadth, and about 16 feet in height; it contains some 7,170 cubic feet, and it was, according to the plans designed, for four beds. There were, however, only two in it at the date of my visit. This ward is efficiently lighted by means of two windows. These windows, however, are placed in adjacent instead of in the opposite side walls; they only reach to within about six feet of the ceiling, and the only part in each which can be made to open does not exceed 16 square inches. A small ventilating opening is further placed between the window and the ceiling; but the ward is obviously very imperfectly ventilated. The second ward is quite small; it has a floor space of 128 square feet and 1,536 cubic feet. These two wards are only available for the treatment of a single



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infectious disease and for the reception of persons of one sex, for the smaller one is only reached from the larger into which it opens. The town water is laid on to the premises, and the drainage passes into the public sewer, there being no air break between the bath and the lavatory waste-pipes on the one hand, and the sewer on the other. In the ground behind the hospital is a mortuary fitted for the purposes of post-mortem examinations. An ambulance belonging to the Hartlepoons Infirmary is always available on payment of a fee of 2s. 6d. No means of disinfection have as yet been provided.

Cost of con-  
struction and  
maintenance.

The original cost of the hospital and premises to the Port Sanitary Authority was 855*l.* 17*s.* Of this amount a sum of 77*l.* 2*s.* 4*d.* was for the purchase of the freehold of the site; the building cost 764*l.* 10*s.*, and the remainder, viz., 14*l.* 4*s.* 8*d.*, was expended in fittings and furniture. The care-keeper and his wife, the latter of whom was formerly a hospital nurse, receive 5*s.* a week and coals so long as the hospital is empty. When any patients are under treatment the wages will be raised to 1*l.* a week, and board will in all probability be also provided. The expenses incurred in maintaining the hospital during 1878 and 1879 have respectively been 23*l.* 18*s.* 9*d.* and 29*l.* 17*s.* 8*d.* this sum including wages, rates, and taxes, together with the cost of fuel, necessary repairs, &c. The Medical Officer of Health to the Port is in medical charge of the hospital. No fee for his services have, however, as yet been determined on, because the building has never been used. Six cases of enteric fever and one of dysentery have, it is true, occurred within the jurisdiction of the Port Authority since the hospital was opened, but as they were all single cases it was not thought worth while to incur the expense attendant upon their being removed to the Port Hospital, and they were, in consequence, taken to the Hartlepoons General Infirmary, which is partly supported by means of a voluntary rate levied on ships entering the port. Owing to this arrangement sailors have the right of admission free of charge.

## HARTLEPOOL URBAN SANITARY DISTRICT.

Population in 1881, 12,684. Rateable value (1880), 26,729*l.*

Infectious  
wards at the  
Hartlepoons  
Hospital.

The only means available for the isolation of cases of infectious diseases for this district is at the Hartlepoons Hospital, a general infirmary having within its limited enclosure, and in near proximity to the general hospital buildings, a separate two-storied block originally constructed for the reception of any cases of infectious disease or of erysipelas arising within the general wards, and also for "foul cases." This block is now also used for infectious diseases sent in from without, as also for certain non-infectious cases. Thus at the date of my visit I found a case of "ulcer of the leg" under treatment there. It contains four rooms, two on each floor. Three of these rooms, each containing some 4,200 cubic feet, and being provided with two double-hung sash windows, one in the front and one at the back, as also an opening for ventilation at the ceiling level, constitute the wards. Only one ward is kept furnished, and this contains three beds. On each floor is a badly-contrived watercloset opening directly into a central lobby with which the wards communicate. Water is only laid on to the water-closets; there are no sinks; and there is no administrative part separate from the general hospital. The nurse for the infectious block is the hospital laundress.

Spread of  
small-pox to  
general wards.

This building is obviously quite unsuited to the purposes to which it is now put, and when a few years ago some cases of small-pox were



under treatment in it, the disease, as might have been anticipated, spread to some patients as well as to a servant in the main building.

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The Hartlepool Sanitary Authority refer to the building above described as meeting the requirements of their district, but it seems doubtful whether any case has ever been sent into it by them. It is true that until recently the Town Council gave an annual subscription towards the general funds of the hospital, and that the Mayor in return was provided with a certain number of admission tickets, but so far as infectious diseases are concerned, I cannot learn that the Sanitary Authority has, even by the gift of one of these tickets, had any part in securing means of isolation.

The total number of cases under treatment in the infectious wards, and the total number of deaths in the urban district from the causes specified, during the three years, 1876-78, were as under. The patients, many of whom were sailors, were admitted both from the town and the surrounding district:—

				1876.		1877.		1878.		1879.		Cases under treatment, and deaths in the urban district.
				Deaths in Urban District.	Cases admitted to Hospital.	Deaths in Urban District.	Cases admitted to Hospital.	Deaths in Urban District.	Cases admitted to Hospital.	Deaths in Urban District.	Cases admitted to Hospital.	
Scarlet fever	...	...	...	2	—	38	—	13	—	4	—	
Small-pox	...	...	...	—	3	1	3	—	1	—	—	
Enteric fever	...	...	...	10	11	4	6	11	10	1	2	
Typhus fever	...	...	...	—	1	—	—	3	2	1	—	
Other diseases	...	...	...	?	12	?	6	?	13	?	9	

The *Easington Rural Sanitary Authority* also speak of these infectious wards as available for the purposes of their district, but although scarlet fever has been very prevalent in their district they have never made any use of them. Indeed, an annual subscription which they paid up to 1878, has since then, I am informed, been withdrawn.

HUDDERSFIELD URBAN SANITARY DISTRICT.

Population in 1881, 81,825. Rateable value (1880), 280,000*l*.

The hospital for infectious diseases for the borough of Huddersfield, known as the Birkby Hospital, has been in use since 1873, it having been established owing to an epidemic of small-pox in 1872-73. Until 1880 it consisted of two detached buildings which formerly constituted the workhouse and the workhouse infirmary for the Huddersfield Union. In 1880 a third building was erected on the same premises.

Origin of the hospital.

The site consists of a piece of land about one and a quarter acres in extent, situated near the outskirts of the inhabited portion of the borough. It is only imperfectly closed. The soil is clay intermixed with boulders.

Site and soil.

The principal building is a two-storied one which constituted the old workhouse. The ground floor is reserved for administrative purposes. The first floor contains bedrooms for the matron and nurses, and also four rooms for the reception of patients, two of them being cut off from

Hospital buildings.



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the others and having a separate staircase. The latter rooms have, as a rule, been reserved for cases of small-pox, which on one occasion spread to a nurse employed in another part of the building. None of the rooms in this building call for any detailed description. They are of low pitch, they are not provided with proper means of cross-ventilation, and at the date of my visit they contained an excessive number of beds. The water-closets in this building open directly into the passages. The former workhouse infirmary is a single-storied detached building divided in the centre by means of an entrance lobby and a nurse's room fitted with windows looking into two wards, one at either end. It is provided with means of cross-ventilation by windows in the opposite side walls. Each ward contains eight beds. These wards are, under ordinary circumstances, reserved for enteric-fever patients, but, at the date of my visit, one of them contained scarlet fever, and the other enteric-fever patients. The water-closets belonging to the building are only imperfectly separated from the wards. Altogether there are 40 beds in these two buildings.

The amount and character of the accommodation available in these buildings being, however, found to be quite inadequate to the increasing demands made upon them, a new detached ward pavilion was erected in 1880. It is an attractive Gothic structure built of red bricks with stone dressings, and it was designed by the late borough surveyor. The outer walls are 18 inches thick. This pavilion contains two wards, with a porch, bath-room, and nurse's room between them; and attached to the northern end of the building is a two-storied block containing a medical officer's room, a kitchen, and an entrance hall on the ground floor, and two rooms upstairs. The latter each measure 304 square feet, and 3,344 cubic feet; they are provided with two double-hung sash windows in adjacent walls, and are available for administrative purposes or for "convalescents." One of the two wards is a simple oblong; it has an area of 1,300 square feet and a capacity of 24,700 cubic feet. The second ward has at its outer end a small projection to the front and rear to balance the two-storied administrative block; it has an area of 1,756 square feet, and a capacity of 33,364 cubic feet. The walls of these wards are 16 feet 6 inches high at the sides, and 20½ feet 6 inches to the flat ceiling at the collar of the roof. Both wards are provided with windows in opposite external walls, and the larger one has two windows in the outer end wall. All the ward windows consist of four sashes. The lower ones are two large fixed sashes, those above are small-hinged sashes each about two feet square. These latter alone can be opened, and there is thus no window opening within some 10 feet above the floor level, and some 9 feet below the flat part of the ceiling. Each ward is provided with an open fireplace, and also with a coil of hot-water pipes fixed on a slab of stone in the centre of the ward. The stone is perforated with holes through which fresh air from without will pass through the coil of pipes into the ward. There are also louvred ventilating openings through the roof. Opening out from each ward is a small lobby and a watercloset beyond; but neither the water-closet nor the lobby is provided with proper means of cross-ventilation.

Water supply  
and drainage.

The town water is laid on to the hospital, and the premises are drained into the public sewer.

Admission of  
patients.

The patients admitted into the hospital are all derived from the borough of Huddersfield, and although a few persons in receipt of temporary relief from the guardians have been admitted, paupers are as a rule excluded. During the three years 1878-80 the admissions, together



with the deaths registered in the borough from the causes specified, have been as under:—

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Date.	Small-pox.		Scarlet Fever.		Diphtheria.		"Fever."		Measles.	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1878 ... ..	0	2	48	110	6	1	31	25	3	8
1879 ... ..	0	0	87	154	6	1	23	16	46	4
1880 ... ..	2	5	23	56	0	4	55	63	33	5
1878-80 ... ..	2	7	158	320	12	6	109	104	82	17

Infectious fevers are not admitted into the Huddersfield Infirmary, and as none of the diseases specified were, during the period referred to, treated at the workhouse, the above table shows the total amount of isolation in hospital which was carried out.

It will be observed that the Birkby Hospital has been specially useful in securing the isolation of cases of scarlet fever, and since this disease is most frequent amongst children, I sought information as to the experience obtained in Huddersfield with regard to the admission of the young. Such difficulties as formerly occurred are stated to a great extent to have passed away, and children now form a very large proportion of the cases admitted. In the three years 1878-80 the total admissions at all ages were 452, and of these 303, or 67 per cent., were children of 10 years of age and under. The details were as follows:—

Isolation of  
young  
children.

—							1878.	1879.	1880.
Under	1 year	...	...	...	...	...	3	5	1
	1 year	...	...	...	...	...	4	6	2
	2 years	...	...	...	...	...	12	16	3
	3 years	...	...	...	...	...	12	22	11
	4 years	...	...	...	...	...	17	16	7
	5 years	...	...	...	...	...	19	16	10
	6 years	...	...	...	...	...	20	17	5
	7 years	...	...	...	...	...	6	22	5
	8 years	...	...	...	...	...	4	6	7
	9 years	...	...	...	...	...	2	5	7
	10 years	...	...	...	...	...	5	5	5
Above 10 years	...	...	...	...	...	...	104	136	63
							42	39	68
Totals	...	...	...	...	...	...	146	175	131

In the case of seven children whose ages varied from nine months to three years, and who came under treatment in 1878 and 1879, the mothers were allowed to accompany their children. In some of these instances they have, however, after taking a bath and having their clothes "disinfected" returned to their homes in a few days.

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Compulsory  
notification of  
infectious  
diseases.

The admission of patients into this hospital has been favoured by the fact the Corporation in 1876 procured a special Act requiring, amongst other things, the compulsory notification of cases of infectious diseases. The success obtained, however, in this regard was far less than had been anticipated, owing to the wide interpretation that was given with regard to the working of the clause relating to this subject, and which provided that such notification was only to be given in the case of a person who was "without proper lodging and accommodation" "enabling the case to be properly isolated so as to prevent the spread of the disease or the proper treatment thereof." In 1879 information was given under this clause in 244 cases, 175 of whom were removed to the hospital. But by various means 174 cases of infectious diseases were heard of concerning which no information had been given, and owing partly to the late period at which the information was acquired, only three of them were removed to hospital. The benefits which followed on this incomplete and partial information were, however, such that the Corporation determined in 1880 to seek new powers with a view of remedying the defect in the Act of 1876, and of further controlling the spread of infection. These powers are embodied in the Huddersfield Improvement Act, 1880; they came into operation just before the date of my visit, and the clauses are appended to this report.

Disinfection,  
&c.

Nelson's disinfecting stove is in use at the hospital. In dealing with infected articles the practice has been to raise the temperature by means of gas until the thermometer indicates a temperature varying from 150° to 170° Fahrenheit, and then to leave the articles in the stove for ten minutes. No experiments have been made with a view of ascertaining the extent to which either the heat or the sulphur can penetrate articles such as beds or pillows. A bed was once burnt when the thermometer indicated 170° Fahrenheit, and some sheets have been scorched. When patients are removed to the hospital their bedding and clothing are dealt with in the stove. Persons residing with any such patients are also, as a rule, taken to the hospital, and whilst there they take a bath; their clothing is stoved, and their homes are fumigated with burning sulphur.

Ambulance.

An ambulance, not provided with a movable stretcher, is also kept on the premises. It is submitted to the fumes of carbolic acid after each use.

Visitors.

Visitors are only admitted in special cases, or where fatal symptoms are anticipated, but they are in certain instances allowed to see their relatives through the ward windows. Visitors to any but the enteric-fever wards are required before leaving to take a bath and to have their clothes "stoved," regulations which are found practically to do away with the demand to enter the wards.

Compulsory  
removal to  
hospital.

Under section 65 of the Huddersfield Improvement Act, 1876, power is given for the removal of any patients to the hospital who may be suffering from an infectious fever, and who are, in the opinion of the medical officer of health of the borough, "without proper lodging and accommodation, enabling the case to be properly isolated so as to prevent the spread of the disease, or to be properly treated." In two instances an order of a justice has been obtained under that section, and in both cases the patients quietly submitted to removal on hearing of the steps which had been taken. In one of the cases the order was granted, solely with a view of preventing the spread of infection, the patient having admittedly such accommodation as was needful for his own comfort and prospects of recovery. Indeed, the patient who was suffering from scarlet fever was already convalescing when the order was obtained.



Section 66 of the Act above referred to provides for the recovery of any expenses incurred in removing to or maintaining in hospital, any patient who is not a pauper, and the debt is deemed "due to the Corporation from such patient or from the husband or parent or guardian of such patient, if such patient be a married woman or an infant." In the majority of cases, however, no charge is made by the Corporation either for the maintenance and treatment of patients in the hospital, or for such measures of disinfection as are carried out after their removal from their houses. But where patients or their friends can obviously afford to pay, a charge varying from 5s. to 15s. a week is made for maintenance in hospital. A sum of 10s. 6d. is also at times made for such measures of "disinfection" as are carried out. In one case only where a well-to-do person sent his five children to the hospital has it been found necessary to take any proceedings in this matter, and in this case the threat of action alone sufficed for the recovery of the payment demanded.

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Recovery of expenses of maintenance, &amp;c.

The general and medical administration of the hospital is vested in the hands of Dr. J. S. Cameron, the Borough Medical Officer of Health, who is immediately responsible to a committee of the Corporation. Dr. Cameron has also been appointed physician to the hospital. Patients can, however, at their own cost, be attended by medical practitioners of their own choice. In only two instances during the 12 months preceding my visit had any patients availed themselves of this privilege.

General and medical administration, &amp;c.

The original cost of the buildings hitherto used as a hospital was about 2,500l., exclusive of furnishing. The new pavilion recently erected has cost 2,400l., not including the furniture, which, at the date of my visit, had not yet been provided.

Cost of purchase and construction.

The cost of maintaining the Birkby Hospital, together with that incurred for such measures of disinfection as were carried out during the two years ending respectively August 31, 1879 and 1880, has been as follows:—

Cost of maintenance, &amp;c.

	Year ending Aug. 31, 1879.	Year ending Aug. 31, 1880.
	£ s. d.	£ s. d.
Physician ... ..	70 0 0	70 0 0
Matron ... ..	52 0 0	52 0 0
Nurses and servants ... ..	195 17 8	156 7 8
Finance committee, rent of hospital ... ..	125 18 0	209 16 0
Overseers of Huddersfield... ..	29 0 0	—
Rates and taxes ... ..	18 6 2	14 12 5
Coal and gas... ..	100 3 3	64 2 7
Provisions ... ..	455 13 8	314 4 4
Drugs... ..	47 5 0	48 8 3
Plumber, painter, mason, &c. ... ..	49 19 4	66 17 0
Furniture ... ..	37 2 8	6 19 0
Quilts and drapery ... ..	46 3 6	31 7 0
Ironmongery, &c. ... ..	24 1 8	36 6 3
Sundries ... ..	20 19 8	9 0 6
Sanitary inspector, sundry expenses ... ..	14 3 6	24 8 2
Ditto allowance for clothing ... ..	4 0 0	4 0 0
	£1,290 14 1	1,108 9 2

In the year ending August 31, 1879, a sum of 31l. 3s. 10d. was repaid for the maintenance of patients in the hospital, and an additional 18s. for disinfection of clothing, &c., making a total of 32l. 1s. 10d. and thus reducing the expenditure for the year to 1,268l. 12s. 3d. In the year ending August 31, 1880, the sums refunded for the same purposes were

Repayments by patients, &amp;c.

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22*l.* 11*s.* 4*d.* and 1*l.* 2*s.* 6*d.* respectively, thus making a total of 23*l.* 3*s.* 10*d.*, and so reducing the annual expenditure to 1,085*l.* 5*s.* 4*d.*

It has already been stated that the Birkby Hospital is situated just upon the outskirts of the inhabited portion of the borough. Its situation, however, as regards surrounding houses is such that inquiry was made as to the influence of the hospital on the neighbourhood in which it is placed. One dwelling-house lies about 60 feet to the east of that part of the hospital which has hitherto been in use, two within about 170 feet, and some 20 within a little more than 400 feet of it. In no instance has it been alleged that any infection has spread to these houses, and even under a system requiring the compulsory notification of infectious diseases no such case has been heard of in the immediate vicinity of the hospital. Neither has any complaint been received as to the spread of infection in any part of the borough by means of the ambulance. Indeed the only instance in which the hospital has been referred to as having caused the spread of infection, was in the case of a patient who suffered from scarlet fever after having come to the hospital gateway and having there conversed, and held communication, with a convalescent from that disease. Scarlet fever was, however, at that time epidemic in the borough, and other sources of infection were numerous. Measures have, since the date of this occurrence, been taken to prevent any such communication with patients being held.

#### THE HUDDERSFIELD IMPROVEMENT ACT, 1880.

##### *Provisions as to Infectious Diseases.*

Further  
powers with  
respect to pre-  
vention of  
infection from  
disease.

63. The following provisions for prevention of infection from diseases, in addition to those contained in the Public Health Acts, shall take effect :

- (1.) The Corporation may provide or license or contract with any person or persons to provide nurses for attendance upon persons suffering from infectious diseases within the borough, and may charge a fee not exceeding five shillings for any such license, and may charge a reasonable sum for the service of any nurse provided by them ;
- (2.) The Corporation from time to time may order public or private schools situated in neighbourhoods affected by any infectious disease to be temporarily closed or suspended ;
- (3.) The Corporation may order any shop, dairy, or place for the sale of beverages by retail, or for the sale or storage of provisions, or of clothing, or of other articles liable to communicate or retain infection, or any common lodging-house to be temporarily closed whenever, from the appearance of infectious disease therein, or in rooms in connexion therewith, such action appears to the Corporation to be necessary, and may take all such means as seems to them desirable for preventing the entrance of the public thereinto, or of the issue therefrom of any of the matters aforesaid ;
- (4.) In case of the existence of cholera, small-pox, or scarlet, puerperal, typhus, or typhoid fever in any house within the borough, the Corporation may issue an order declaring such house or any part thereof an infected place, and forthwith until such order has been determined by another certifying it free from infection, the following regulations shall, in respect of such house or part of a house, be observed :
  - (a.) No person shall in any such house or part of a house exercise any indoor occupation which necessitates the handling of any clothing, food (including beverages), or article likely to communicate or retain infection and intended for sale or for the use of persons belonging to another family ;
  - (b.) No bedding, clothing, or other articles liable to communicate or retain infection shall be removed from such house or part of a house without previous disinfection or without proper precautions (to the satisfaction of the Corporation) for the purpose of being disinfected or destroyed ;
  - (c.) When the room or rooms occupied by the persons suffering from such



disease can in the opinion of the Medical Officer of Health be effectually separated, and are so separated from the other parts of the same house or building, the rooms so occupied only shall be deemed to be affected by such order and regulations ;

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(d.) No person dwelling in any such house or part of a house, shall work at any other place in the same room with healthy persons, except with the written permission of the Medical Officer of Health, and after disinfection of the person and clothing ;

(e.) No nurse attending on any person suffering from any such infectious diseases shall either at the same time or afterwards attend as nurse on any other person unless with the written permission of a registered medical practitioner, and after disinfection of the person and clothing ;

(5.) The Corporation shall make compensation to any person who shall have complied with the provisions of this section and who has thereby sustained loss ; but such compensation shall be in regard only of direct material and pecuniary loss, and not in respect, of any consequential loss or damage.

And any person who shall wilfully offend against any of the foregoing provisions shall be liable to a penalty not exceeding five pounds, and to a daily penalty not exceeding forty shillings.

64. Section sixty-seven of the Act of 1876 is hereby repealed, and in order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation who is suffering from infectious disease, the following provisions shall have effect ; (that is to say,)

Notice to be given of person suffering from certain diseases.

(1.) If any such inmate be suffering from any such disease as aforesaid, the occupier or person having the management or control of such building (or if such occupier or person be prevented by reason of such disease, then the person in charge of such inmate), shall, so soon as he shall become aware of the existence in any such inmate of any such disease forthwith give notice in writing to the sanitary officer of the Corporation at their sanitary offices or at the chief police station of the existence in such inmate of such disease ;

(2.) If such inmate be not a member of the family of such occupier or person, the head of the family (resident in such building) to which such inmate belongs, or if there be no such head, or if such head be prevented by illness, then such inmate (unless prevented by reason of such disease or of youth) shall, on becoming aware of the existence in such inmate, or in his own person, as the case may be, of such disease, forthwith give notice thereof in writing to such occupier or person ;

(3.) The Corporation shall provide and supply gratuitously to every registered medical practitioner resident or practising in the borough who shall apply for the same forms for the certificate or declaration to be made by such medical practitioner of the particulars hereinafter mentioned in relation to such cases according to the form set forth in the third schedule to this Act ;

(4.) Every medical practitioner attending on or called in to visit such inmate shall, on becoming aware that such inmate is suffering from any infectious disease forthwith fill up, sign, and deliver, or send a certificate or declaration to the Corporation at their sanitary office, or if the same be closed, at their chief police station, stating, according to the form so prescribed, the name of such inmate, the situation of such building, the nature of the disease, and the name of such occupier or person ;

(5.) The Corporation shall pay to every registered medical practitioner who shall in pursuance of this section duly make and give any such certificate or declaration a fee of one shilling for each such certificate or declaration ; but only one such certificate need be given and only one such fee shall be payable within an interval of thirty days to the same medical practitioner in respect of the same disease occurring in the same building ;

(6.) And any person who shall wilfully offend against this enactment shall for every such offence be liable to a penalty not exceeding ten pounds.



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Other diseases may be declared to be within the foregoing provision.

Corpses of persons dying from infectious disease not to be conveyed in public conveyances.

Regulations of Secretary of State applicable to burial grounds to apply to churchyards, &c.

65. The Corporation may from time to time, by resolution on the report of the medical officer of health, order that measles, German measles, erysipelas, whooping cough, or splenic fever, and, with the sanction of the Local Government Board, any infectious or contagious disease other than those specifically mentioned in this Act, shall be deemed to be an infectious disease within and subject to the provisions of this Act.

Any such order of the Corporation may be permanent or temporary only and if temporary the period during which it is to continue in force shall be specified therein and the Corporation shall give public notice of the order by publishing the same by advertisement in the local newspapers circulating in the borough, and after such public notice has been given the provisions of this Act shall, so long as the order continues in force, apply to the disease specified therein in like manner in all respects as if the disease were an infectious disease specifically mentioned in this Act.

The production of the newspapers containing a copy of the resolution shall be conclusive evidence that public notice of the order has been so given.

66. Any person who hires or uses a public conveyance other than a hearse for the conveyance of the corpse of a person who has died from any infectious diseases, without previously notifying to the owner or driver of such public conveyance that the person whose corpse is, or is intended to be, so conveyed has died from infectious disease, and any owner or driver of a public conveyance other than a hearse which has been used for conveying the corpse of a person who has died from infectious disease who shall not immediately afterwards provide for the disinfection of such conveyance, shall be liable to a penalty not exceeding five pounds.

67. The regulations made by one of Her Majesty's principal secretaries of State as to burial grounds provided under the Burial Acts and for the time being in force, and the provisions for enforcing the same, shall extend and apply to and in respect of every yard and ground in the borough used for the burial of the dead, and to the persons having the care or control of such yard or ground was provided under the Burial Acts.

## KENILWORTH URBAN SANITARY DISTRICT.

Population in 1881, 4,150. Rateable value, 20,060*l*.

## LEAMINGTON URBAN SANITARY DISTRICT.

Population in 1881, 22,976. Rateable value, 122,620*l*.

## LILLINGTON URBAN SANITARY DISTRICT.

Population in 1881, 938. Rateable value, 15,891*l*.

## MILVERTON URBAN SANITARY DISTRICT.

Population in 1881, 2,162. Rateable value, 21,297*l*.

## WARWICK RURAL SANITARY DISTRICT.

Population in 1881, 10,650. Rateable value, 100,849*l*.

## WARWICK URBAN SANITARY DISTRICT.

Population in 1881, 11,802. Rateable value, 48,016*l*.

Small-pox leading to hospital provision.

Small-pox being prevalent in Leamington, Warwick, and the neighbourhood in 1877, the hospital for infectious diseases in connexion with the workhouse at Warwick was, with the sanction of the Local Government Board, taken over by the several Sanitary Authorities comprised within the Warwick Union, for the purposes of their respective districts. Some of these districts have since then undergone some re-arrangement, but they at present consist of the Kenilworth, Leamington, Lillington, Milverton, and Warwick urban districts, and the Warwick rural district.

The hospital, which is known as the Warwick "Sanitorium," lies just outside the town of Warwick. It is situated at the back of the workhouse infirmary some 85 feet from the infirmary itself and 75 feet from



its boundary wall, and it is approached by a separate roadway immediately to the south of the infirmary building. The workhouse itself is situated on the opposite side of the roadway. Leamington, Lillington, and Milverton are within from  $1\frac{1}{2}$  to 2 miles of it, and Kenilworth is 5 miles away. Most of the populous parts of the rural district of Warwick are within from 2 to 4 miles of the building, but a few parishes, including Stoneleigh with a population of 1,201, are as many as 6 and 7 miles distant.

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The hospital buildings consist of one pavilion, a wooden hut, and of certain outbuildings; they all occupy the grounds behind and belonging to the workhouse infirmary, and they are only very imperfectly enclosed. Hospital buildings.

The pavilion is a substantial brick building with a slate roof, and having its external walls 14 inches in thickness. It contains in the centre an entrance lobby with kitchen and nurse's room, and on either side a ward. Each ward measures 27 feet by 20 feet by 14 feet, and is provided with double-hung sash windows in the opposite side walls, besides ventilating openings beneath the beds and near the ceiling level. Each ward is provided with an earth-closet to which access is had through a lobby having means of cross-ventilation. At the date of my visit there were six beds in each ward. Since this pavilion was erected a wooden hut, containing one ward and a nurse's room, has been erected by the side of it. The walls and roof of the hut consist of single boards coated with felt, and the building comes into contact with the pavilion in such a way that the earth-closet belonging to one of the wards of the latter can be made to serve also for the hut, an arrangement, however, which at the same time cuts off the means of cross-ventilation into the outer air formerly possessed by the closet lobby. This hut was not furnished at the date of my visit.

The outbuildings consist of a washhouse, a "fumigating chamber," and an ambulance shed containing what was formerly a private omnibus. This conveyance still remains in part lined with cloth.

The general management of the hospital is in the hands of a Committee of Management, consisting of members who are elected by the several sanitary authorities using it, and who hold office as long as they remain members of the authorities. Mr. A. E. Davis, of Leamington, acts as secretary to this committee, at an annual salary of 15*l.*, and the master of the workhouse has hitherto undertaken the general administration and supervision of the establishment, receiving an occasional gratuity for his services. Mr. A. L. Heale, surgeon, of Warwick, receives a retaining fee of 10*l.* a year as medical attendant, and a fee of 2*l.* for every patient coming under his treatment. Patients can, however, at their own cost, be attended by medical practitioners of their own choice. General and medical administration.

The admissions to the hospital since it was first used by the several Sanitary Authorities concerned in May 1877 have been as under:— Admission of patients.

—	Small-pox.	Scarlet Fever.	"Fever."	Measles.
May to December 1877 ...	24	0	0	0
1878 ...	0	23	0	0
1879 ...	0	36	1	0
1880 ...	1	28	1	1
May 1877 to December 1880 ...	25	87	2	1



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Social status.

Districts  
whence  
patients were  
derived.

Of the 91 patients admitted in the three years 1878-80, 59 have belonged to the labouring classes, 9 were domestic servants, 13 were members of tradesmen's families, 4 were clerks, 4 were from the houses of brewers or publicans, and 2 were paupers.

Of the same 91 patients, 45, namely 44 having scarlet fever and 1 enteric fever, were received from the urban district of Warwick, in which the hospital is situated; 39, namely 37 having scarlet fever, 1 small-pox, and 1 measles, came from Leamington, which is two miles away; 1 suffering from enteric fever came from Kenilworth, which is 5 miles distant; and 6 came from Radford, which lies within the Warwick Rural district, and is 4 miles off.

Having regard to the populations of the districts for which the hospital is available the admissions have been by no means numerous. In some of them, however, the several infectious fevers which have been received into it have been but very slightly prevalent. Thus in the three years 1878-80 the deaths registered from those fevers in the Kenilworth urban district amounted to 2 from scarlet fever, 1 from "fever," and 8 from measles. In the Lillington urban district they included 1 from measles only; and in the Milverton urban district, only 2 deaths from "fever," &c.

In the Leamington urban district, on the other hand, the deaths registered from the same causes amounted to 49 from scarlet fever, including 8 which occurred in the "Sanatorium" itself amongst patients from that district, 22 from measles, and 5 from "fever," besides 6 from diphtheria; whereas the admissions during the three years in question were 37 cases of scarlet fever, 1 small-pox, and 1 of measles. In the Warwick rural district 20 deaths from scarlet fever, 8 from "fever," and 6 from measles were registered in the same three years, but only 6 cases, namely, a woman and five children, suffering from scarlet fever, and all from the same village, were admitted. In the Warwick urban district the deaths registered during the same period were 36 from scarlet fever, 16 from measles, and 4 from "fever"; whereas the admissions were 44 cases of scarlet fever and 1 case of enteric fever.

Hindrances to  
isolation.

The small number of admissions from some of the districts, when compared with the amount of infectious disease prevalent in them, calls for further notice. Thus, in 1880, as many as 100 cases of scarlet fever are known to have prevailed in the urban district of Leamington, and 23 only were received into the hospital. It must, however, be remembered that, from the character of the houses in Leamington, the means available for the partial isolation of the sick in their own homes are more complete than is commonly the case. But it is impossible to dissociate the failure to secure more frequent isolation from the imperfect character of the hospital and from its surroundings. The absence of accommodation for the simultaneous isolation of cases of more than one disease in both sexes is itself a serious drawback. The position, also, of the hospital in the workhouse grounds, which are entered at a lodge where a pauper acts as porter, and which are tilled by pauper labour, in addition to the circumstances that the building is separated and partly hidden from the public road by a pauper establishment, and that it is partly administered from the workhouse itself, cannot fail to hinder its use by the non-pauper population. Indeed, in a report drawn up and presented in July 1877 to the Committee of Management, the Medical Officers of Health for the districts concerned refer not only to the proximity of the hospital to the workhouse as not being "absolutely free from risk to the inmates of the workhouse," and to "two cases of small-pox which recently occurred in the workhouse, and in which there was little room for



"doubt that the infection was conveyed from the Sanatorium," but they add that "the nearness" of the latter "to the workhouse and its former connexion with that establishment are likely to impair its general usefulness." In my recent interview with Dr. Wilson, Medical Officer of Health for the Warwickshire Combined District, and with Dr. Baly, Medical Officer of Health for Leamington urban district, I found that this general opinion was still maintained, but at the same time no instance had come within their own notice in which the locality of the hospital is believed to have led to a refusal to enter it. The subject had, however, received the attention of the Committee of Management, who have, I am informed, hitherto unsuccessfully, endeavoured to find a suitable site for the erection of a hospital for infectious diseases.

The tardiness with which information as to the existence of infectious diseases is received has also tended to prevent more frequent use of the hospital. Although there has as a rule been no difficulty in isolating cases of small-pox as soon as the cases have been identified as such; yet as regards scarlet fever the experience is very different, the cases being rarely reported in time to prevent the spread of infection, and the reports, especially those from Leamington, being generally limited to patients, belonging to the poorer classes, or receiving medical attendance through clubs, dispensaries, and similar institutions. Much the same applies to other districts; thus, in 1880, 5 fatal cases of scarlet fever which occurred in the Warwick rural district could according to Dr. Wilson easily have been removed to the hospital had the patients not been too ill to bear removal when they first came under his notice.

The distance of the hospital from some of the more populous places in the several sanitary districts concerned must also to some extent have hindered its use. Thus, in the case of scarlet fever, the proportion of cases isolated to the total deaths registered, was, apart from Kenilworth, where only two deaths took place in three years, 1878-80, smallest in the case of the Warwick rural district, parts of which lie wide of the hospital, whereas it was greatest in the Warwick urban district in which the "Sanatorium" is situated.

No action has been taken by any of the sanitary authorities under section 124 of the Public Health Act, 1875. Some preliminary measures were, however, taken as regards a case of scarlet fever in a canal boat in the Leamington urban district, the patient then assenting to removal. In certain cases payments have been made by patients or their friends, and the usual weekly fee of 1*l.* has at times been reduced as low as 5*s.*, but in only one instance has any action been taken to recover the cost incurred in the maintenance and treatment of any patient. In this instance a Leamington publican sent two of his children who were suffering from scarlet fever into the hospital, and it being the opinion of the sanitary authority that the isolation in hospital had mainly been resorted to in order that the publican's business should not be interfered with, the ordinary charge was made, and in default of payment proceedings under section 132 of the Public Health Act, 1875, were instituted. The county court judge, while giving leave for appeal on the point of law, held, however, that although according to section 132 "any expenses incurred by a local authority . . . shall be deemed to be a debt due from such patient to the local authority," yet that no statutory liability attached to the parent of a patient, unless such parent previously guaranteed the payment demanded. The Hospital Committee did not think it desirable to incur the expense of an appeal, but since then it has been determined that in the case of patients capable of paying for their maintenance whilst in hospital, a written guarantee shall be

Public Health  
Act, s. 124.Payments by  
patients, Public  
Health Act,  
1875, s. 132.



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tenance, &c.

procured either from the patients themselves or their parents before admission.

In-door paupers of the Warwick Union are paid for at the rate of 1*l.* a week; all out-door paupers are dealt with, irrespective of the question of pauperism by the sanitary authorities in whose districts they reside.

A rent of 50*l.* a year is paid to the Guardians of the Warwick Union for the use of the hospital; each of the sanitary authorities pays the expenses incurred for the treatment and maintenance of the patients sent in from their respective districts; and the general cost of maintaining the establishment is divided between the authorities according to the rateable value of the districts. The actual expenses incurred during the year 1880 were as follows:—

	£	s.	d.
Medical officer, salary and fee	79	5	6
Clerk, salary	11	5	0
Gratuity to master of workhouse	20	0	0
Rent	50	0	0
Furniture, repairs, &c.	41	2	0
Maintenance of patients	46	5	2
Nursing	40	5	0
Coal	8	3	5
Sundries	20	4	11
	£316	11	0

Influence of  
hospital on  
surrounding  
district.  
  
Disinfection.

With the exception of the two cases of small-pox to which reference has been made, as having occurred in the workhouse, no case has ever occurred in which the hospital has in any way been instrumental in the spread of infection.

In addition to the “fumigating chamber” at the hospital, the borough of Leamington possesses a disinfecting stove manufactured by Messrs. Bradford & Co. It is throughout constructed of iron, but though standing in the open air under a railway arch behind the Town Hall, the iron plates are at one side completely exposed; elsewhere it is cased in wood. The stove is heated by means of a furnace. The present and late inspectors of nuisances, who have had charge of it, have only heated the stove until the thermometer with which it is fitted has indicated a temperature varying from 200° to 220° Fahr., and no experiments have been made to ascertain how far the temperature is equably distributed throughout the stove, nor the extent to which it penetrates such articles as beds, pillows, &c. The cost of the stove and of its erection was 80*l.* No charge is made to any residents within the borough for the use of this stove.

LEEDS URBAN SANITARY DISTRICT.

Population 309,126 in 1881—Not rated.

Hospital site  
and buildings.

The Leeds House of Recovery affords the principal means of isolation for infectious diseases which is available for the borough of Leeds. It is a charitable intitution which was founded in 1803, and with the exception of certain annual payments made to it by several Sanitary and Poor Law Authorities, and by some patients, it is supported by voluntary contributions.

The existing hospital was erected in 1846, and it is situated in the north-eastern portion of the borough at a distance of about 1½ miles from its most populous districts, and some 7 miles from its extreme



limits. The site covers about 3 acres of land, it is nearly square in shape, and is bounded on all four sides by public streets. The hospital is a two-storied building some 1,250 feet in length, with a short wing projecting to the rear at either end, and a larger central wing for administrative purposes also projecting to the rear.

The central part of the front portion of the building is reserved for nurses and other members of the staff, and on either side are arranged on both floors small wards, which open into a common corridor extending along the back of the main building and the end wings. There are in all 36 small wards containing from one to four beds each, the total number of beds being 80.

The wards open on both floors into a common corridor which is well lighted and well ventilated; they are provided in the external wall with one or more double-hung sash windows, and in the wall adjoining the passage with large ventilating openings a little above the floor level and near the ceiling. The floor-space per bed varies from 70 to 162 square feet, and the cubic capacity from 880 to 2,025 cubic feet. Open fireplaces are provided throughout. The water-supply is from the Corporation mains, and the drainage is into the town sewers. There is, however, in several places no proper disconnexion between the drains and interior of the building.

The total admissions to the House of Recovery during the ten years 1871-80 have been as under:—

Date.	Small-pox.	Scarlet Fever.	Enteric Fever.	Typhus.	"Fever."	Erysipelas.	Other Diseases.*	Total.
1871 ...	118	12	225	106	†60	—	42	563
1872 ...	33	2	155	16	†61	—	12	279
1873 ...	2	34	129	42	21	7	9	244
1874 ...	—	40	72	162	44	12	10	340
1875 ...	—	32	68	33	13	5	31	182
1876 ...	—	105	94	30	15	3	38	285
1877 ...	—	47	64	10	6	—	31	158
1878 ...	—	60	95	28	14	—	24	221
1879 ...	—	65	33	3	5	—	38	144
1880 ...	—	45	66	8	5	1	30	155
1871-80 ...	153	442	1,001	438	244	28	265	2,571

\* *i.e.*, Chicken-pox, measles, pneumonia, &c.

† Including 25 cases of relapsing fever in 1871 and 23 cases in 1872.

The patients, however, are derived from various sources, for according to one of the rules of the institution, "all persons labouring under infectious fevers, who are unable to provide medicine or proper accommodation for themselves, are admissible, subject to the payment of 3s. 6d. per day from their respective townships."

Under this rule patients are sent in by the Guardians of the Leeds, the Bramley, the Hunslet, and the Holbeck Unions, occasional cases

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Admission of  
paupers.  
  
Admission of  
young  
children.

come in from the various urban and rural sanitary districts in the neighbourhood of Leeds. Since October 1880 the Leeds Corporation have in their capacity of a Sanitary Authority also sent in cases. The hospital has, however, ever since its establishment, been mainly occupied by persons resident in the borough of Leeds, although the cases have mostly been sent in by one or other of the authorities of the Poor Law Unions of which the borough forms a part. Most of the "gratis" patients, varying from about 5 to 20 in a year, have also come from Leeds. Had, however, all the patients admitted been derived from the borough the amount of isolation effected would have been but small when compared with the requirements of a town like Leeds. Thus in 1878 and 1879 only 125 scarlet-fever patients were admitted, whereas the total deaths from that disease in the borough during those two years amounted to 534; indicating in all probability some 5,000 attacks.

The paupers are invariably kept apart from other patients, and hence, it is stated, no inconvenience has arisen from their admission.

In connexion with the question of isolation in scarlet fever, Mr. W. D. Bowkett, the resident medical officer, informs me that he has not experienced any special difficulties on the part of parents as to the admission of children. Where, however, objection has been raised, the mother has been admitted with her child, rather than that the isolation should not be carried out. Of the 523 patients admitted in the three years 1877-79, 183, or 35 per cent. were children of 10 years and under.

*Ages of Patients admitted in the three years, 1877-79.*

Under 1 year	-	-	-	4
1 year	-	-	-	3
2 years	-	-	-	16
3 "	-	-	-	20
4 "	-	-	-	25
5 "	-	-	-	24
6 "	-	-	-	24
7 "	-	-	-	18
8 "	-	-	-	24
9 "	-	-	-	18
10 "	-	-	-	7
				<hr/>
				183
Over 10 years	-	-	-	340
				<hr/>
Total	-	-	-	523
				<hr/>

Visiting.

The regulations as to visiting are somewhat strict, but it is not believed that they have, to any appreciable extent, prevented persons from allowing the removal of their friends and relations, whether young or not, to the hospital. In the case of typhus, visitors are, strictly speaking, quite prohibited. Scarlet-fever patients may be seen once a week by one near relative, from the corridor into which the ward opens; these visits being, however, of very brief duration. Visitors are, at stated intervals, admitted to the enteric-fever wards.

Spread of  
infection  
within the  
hospital.

In view of the fact that the various wards in the House of Recovery open on both floors into a common corridor, and that the various infectious fevers are treated in the adjoining wards, I sought information as to whether there had been any spread of infection from ward to ward. Such spread did take place when small-pox was admitted, and that disease has in consequence been excluded since 1873.



During Mr. Bowkett's experience now extending over some four years, no patient has, however, contracted any infectious disease whilst in hospital; an immunity which is mainly attributed to the fact that both the ward doors and the windows of the corridors are kept open day and night, and also to the precautionary measures which are adopted at the laundry. Indeed, all the patients' clothing, together with their personal and their bed linen, &c., is always sent to the Corporation Disinfecting Stove before being washed. The bedding also of all typhus and scarlet-fever patients is similarly dealt with.

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The position occupied by the hospital calls for some further notice. As already stated the site is on all sides bounded by streets. The hospital wall forms one side of the street, and the other side is occupied by houses. As many as 14 small but somewhat thickly populated streets open out into one or other of the boundary streets, the distance of the houses from the hospital buildings varying at most points from 200 feet to 65 feet, but being at one point only 36 feet. Under these circumstances inquiry was made as to the influence of the hospital on the neighbourhood in which it is situated. Neither the hospital authorities nor Dr. Goldie, the Borough Medical Officer of Health, are aware that any suggestion has ever been made as to the spread of infection from the hospital either directly, or by means of ambulances. Indeed, it is certain that, when small-pox was under treatment in the hospital, no grounds for any such complaint ever arose, for such was the anxiety of the hospital authorities to exclude that disease, that had even a rumour of such spread been heard of, they would, I am informed, have availed themselves of it, and have refused admission to small-pox patients. No complaint has been made as to the spread of infection by the nurses, who on the hospital premises wear uniform washing dresses and caps. When they go out for a walk they are only required to change these two articles, but if leaving for one or more days they are obliged to take a bath and to change all their clothing.

Influence of hospital on surrounding district.

The ambulances, one for small-pox and one for "fever," belong to the Corporation, who always convey patients to the hospital free of cost, an officer being kept for this special duty.

Ambulances.

The Corporation possess two disinfecting stoves, consisting of brick chambers fitted with iron doors, and erected over a furnace. They are contained in a brick building, but there is only one ante-chamber which has to serve both for the reception of infected, and for the temporary storing of disinfected, articles. I learn from Dr. Goldie that the usual practice is to expose all articles to a temperature of 220° Fahr. for two hours, a quantity of sulphur being burned in the stove at the same time. When a temperature of 230° Fahr., as indicated by a thermometer near the stove door, is exceeded, scorching takes place.

Apparatus. &amp;c

The disinfection of infected articles, including those sent from the hospital, and also the fumigation of infected rooms by burning sulphur, is throughout the borough carried out by the Corporation free of cost. The following are the numbers of certain specified articles and of rooms which were "disinfected" during the two years 1878-79, no separate record being procurable as regards articles of clothing:—

Mattresses disinfected	-	-	-	-	-	2,466
Blankets	"	-	-	-	-	3,593
Quilts	"	-	-	-	-	2,346
Sheets	"	-	-	-	-	1,299
Pillows	"	-	-	-	-	7,086
Beds	"	-	-	-	-	2,599
Rooms	"	-	-	-	-	2,434

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## Mortuary.

Means of  
isolation at  
the Leeds  
Workhouse.

A mortuary and post-mortem room have been erected by the Corporation in a central part of the borough, in connexion with an inquest room. In certain cases where the medical officer of health has required either the speedy burial of the bodies of persons dead of some infectious disease, or their removal to the mortuary, the latter course has been adopted.

In addition to the accommodation at the Leeds House of Recovery, there are two wooden pavilions each containing 45 beds, which were erected on the grounds of the Leeds Workhouse during the small-pox epidemic of 1871-72. They are reserved for small-pox, and are intended only for the reception of paupers, but as the Urban Sanitary Authority have made no provision for the isolation of this disease, patients other than paupers are at times admitted. A few cases of "fever" and scarlet fever are also treated in another building on the workhouse premises. Thus in the three years 1877-79, 118 cases of "fever" and 1 case of scarlet fever came under treatment there.

## LEICESTER URBAN SANITARY DISTRICT.

Population in 1881, 122,351. Rateable value, 350,000*l*.

Origin of the  
hospital.

Owing to a prevalence of scarlet fever in Leicester in 1870 and 1871, and to the fear that small-pox, then prevalent in several parts of the kingdom, might be imported into the borough, the Town Council determined in the latter year on the erection of some galvanized iron buildings to serve as a hospital for infectious diseases other than enteric fever, for which disease there is special provision in the Fever House in connexion with the Leicester Infirmary. The site chosen consisted of about 2 acres of Corporation property known as Freake's Ground, which is situated just outside and to the north-west of the borough. During the erection of the buildings, however, small-pox became widely epidemic in Leicester, and it was found necessary to use certain premises in Friar's Road as a temporary hospital. Later on also additional temporary buildings were erected in Freake's Ground, and hospital tents were brought into use.

Site and  
buildings.

The hospital on Freake's Ground is known as the Borough Fever Hospital. The soil on which it stands is clay. Close by are some brick works and also the town depôt for ashes and dry refuse.

The buildings are enclosed by a wooden fence, and consist of (1<sup>o</sup>) one principal group of buildings arranged along the sides of a common corridor; (2<sup>o</sup>) a detached ward-pavilion; and (3<sup>o</sup>) certain out-buildings, including the porter's lodge, a laundry, a disinfecting chamber, an ambulance shed containing an ambulance fitted with a movable stretcher, and a mortuary.

The principal buildings are constructed of galvanized corrugated iron painted outside, and they are lined throughout with wood. They rest on brick piers and have slate roofs. The corridor which runs the whole length of the building is well ventilated by means of double-hung sash windows in its opposite sides. On each side of the corridor are three detached buildings. Those on one side are the administrative block, and two blocks containing accommodation for nurses and stores; on the other side are three separate ward pavilions known as "Fever Wards." The administrative block contains the principal entrance lobby, rooms for the matron, nurses and servants, a kitchen and scullery, a surgery, and store rooms.

The "Fever Wards" are all provided with windows in the opposite side walls and, at one end, also with louvred openings in the roof. The



windows consist of three frames, the upper and lower one of which are hung on pivots and made to open. The heating is effected by means of central stoves and hot-water pipes. At the end nearest the corridor each ward is provided with a nurse's room, which is at times used for a special patient, and a bath-room which is fitted as a lavatory. The waterclosets are in each case separated from the wards by means of a cross-ventilated lobby.

Two of the three fever wards were at the date of my visit occupied by scarlet-fever patients, the third by cases of erysipelas; the two former contained 12 beds, the latter 6 beds; the floor space and cubic space per bed being 125 square feet and about 1,780 cubic feet.

Opening out from one end of the corridor above referred to are some additional wooden buildings, which were erected on account of the small-pox epidemic of 1871. One building is now used for stores, another for additional sleeping accommodation for nurses, and a third is a ward pavilion retained for small-pox cases. This pavilion consists of three wards en suite, and is partly roofed with slate and partly with felt. It has one window at the extreme end, but throughout its entire length the only windows consist of sheets of glass, let into the walls about 8 feet above the floor level, and here and there fitted in frames so as to open. The roof is louvred, and there are apertures for ventilation in the centre of the floor. About the middle of the building is a small ward kitchen, and at the side are waterclosets somewhat imperfectly separated from the wards. The building is throughout heated in the same way as the Fever Wards.

There is accommodation for 28 small-pox patients in this pavilion, and when it is in use communication with the remainder of the buildings is cut off by means of a doorway at the end of the corridor referred to. By means, however, of a sliding panel in the door, food and other necessities are passed from one part of the building to the other. I am informed that hitherto there has been no spread of infection, either from this pavilion to the fever wards or by means of the common corridor, from one of these latter wards to another.

The detached pavilion is professedly reserved for cases of erysipelas. In point of construction it is very similar to the small-pox pavilion, but it is somewhat dilapidated, and apart from two rooms at one end and which were constructed as nurse's rooms it is not fit for the reception of the sick. Both this and the small-pox pavilion were originally coated with tar. Since then they have been whitewashed, but they remain very unattractive in appearance.

At the date of my visit 25 patients were under treatment, namely, 18 suffering from scarlet fever and seven from erysipelas. As yet cases of diphtheria and measles have not been removed to the hospital. The deaths from these two causes in the two years, 1878-79, were, from measles, 117, from diphtheria, 46.

The premises are throughout provided with water from the Leicester Corporation Waterworks, and they are sewered into the town sewer. There is no direct communication between any of the buildings and the drains.

The disinfecting stove is a brick-vaulted chamber containing an iron box, in which a fire is lighted. The heat is evidently very irregularly distributed throughout the chamber, for as soon as a thermometer fixed near a pane of glass in the outer wall exhibits a temperature beyond 200° Fahr. articles are apt to become scorched.

Until the commencement of 1877, the hospital books were not kept in such a manner that any accurate statistics can be compiled from them.

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Water-supply  
and drainage.

Disinfecting  
stove.

Statistics as to  
use of hospital.

APP. NO. I.

The subjoined table, however, shows the total number of cases which have been admitted from the borough, and also the total deaths registered from the causes specified in the three years 1877-79:

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Date.	Small-pox.		Scarlet Fever.		Erysipelas.		Other Diseases.	
	Deaths in the Borough.*	Cases admitted into the Hos-pital.	Deaths in the Borough.*	Cases admitted into the Hos-pital.	Deaths in the Borough.*	Cases admitted into the Hos-pital.	Deaths in the Borough.*	Cases admitted into the Hos-pital.
1877 ...	6	12	33	49	12	10	?	2
1878 ...	1	8	12	50	9	19	?	0
1879 ...	0	0	105	247	4	22	?	0
1877-79 ...	7	20	150	346	25	51	?	2

\* The deaths in these columns include, in addition to those registered in the borough, those of persons removed from the borough to the hospital, which is outside the borough.

The experience obtained in Leicester is somewhat exceptional, inas-much as the number of admissions to the hospital for infectious diseases from each of the specified causes considerably exceeds that of the fatal cases registered. This is especially striking during the year 1879 when the total admissions from certain causes specified reached 269, whereas the deaths registered from the corresponding diseases only amounted to 109, namely, 105 from scarlet fever, and four from erysipelas. The increased use of the hospital in the latter year is believed to have been largely due to the provision contained in section 8 of the Leicester Cor-poration Act, 1879, by which the registration of infectious diseases has been made compulsory. This section is appended to this report. Scarlet fever, which in the two first quarters of 1879 had caused 12 deaths, became widely prevalent about the middle of July, and it spread rapidly in all parts of the borough. On September 13th, the Compulsory Registration of Infectious Diseases came into operation, and in the 15 weeks between that date and the end of December, 499 cases were reported to the Sanitary Authority. Houses where the disease prevailed were at once visited, and numerous precautions were taken to stay the further spread of the epidemic. The inspectors of nuisances also succeeded "in removing to hospital a much greater number of cases than hitherto,"\* as many as 159 scarlet-fever patients being thus isolated during the period named. And not only so, but the isolation was effected, to an extent which had never before been possible, in quite an early stage of the disease; the result being that in the yards where it most prevailed the infection was often limited to the first house attacked, whereas, in former years, it had prevailed "in almost all the houses in " those " same yards."\*

Leicester has for many years past suffered every four, five, or six years from an epidemic of scarlet fever. In 1857-58, 299 scarlet-fever deaths were registered in the Leicester Registration District; in 1863-64, 283 deaths, and in 1870, 265 deaths were registered from the same cause. The next epidemic was in 1875, and the most recent was the

\* Annual Report of the Medical Officer of Health for the borough of Leicester, 1879.

Effect of the registration of infectious diseases in securing isolation.



one in 1879. Now from information supplied to me by Dr. Johnston, the Medical Officer of Health, it appears that the epidemics of 1870 and 1875 both commenced, as did the one in 1879, at about the 27th week, and continued up to the end of the year. In 1870 no means of isolation existed, and during the last 15 weeks of the year 217 fatal attacks occurred; in 1875, 31 cases were admitted to the hospital in the same period, and 94 fatal attacks, including hospital cases, were registered in the borough; in 1879, the type of the disease being, according to general medical testimony, very similar to that obtaining in 1875, the admissions to hospital for the same number of weeks were 159, and the total deaths only 65. In a tabular form the facts as regards 1875 and 1879 stand thus:—

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ADMISSIONS to HOSPITAL, and DEATHS from SCARLET FEVER in LEICESTER, from the middle of September to the end of December in the under-mentioned Years.

Date.	Admission to Hospital.	Deaths in the Borough and in the Hospital.
1875 [Hospital in partial use; no registration of infectious diseases.]	31	94
1879 [Hospital in full use, and registration of infectious diseases in operation.]	159	65

[The mortality statistics for the borough, published after the above was written, point, however, to a prolonged continuance of the scarlet-fever prevalence. See Appendix C., p. 296. March 1882.]

With regard to the increased facilities afforded by the compulsory registration of infectious diseases in securing isolation, it should be stated that it is the opinion of those members and officers of the Sanitary Authority, who have interested themselves most in those questions, that such registration lessens to an important extent the amount of accommodation for the isolation of infectious diseases which it is necessary for a Sanitary Authority to provide.

The use of the hospital has, however, not been limited to the reception of cases of infectious disease, but persons known to have come into contact with infection have been separately isolated there for short periods. Thus, as regards an outbreak of small-pox in 1877, Dr. Johnston writes: "In any house where a case of small-pox occurred I endeavoured to impress the inmates with the fact that the removal of *all* the members of the family to the hospital was the best course to adopt, not only as regarded their own individual welfare, but also that of the town at large. And I am glad to say that all complied with my request, left their infected habitations, and became inmates of the hospital. Altogether 22 unaffected cases were thus admitted into quarantine, and of these, three afterwards sickened. The first case sickened in 48 hours, the second in 72 hours, whilst the third showed no symptoms of the disease till the twelfth day. Now all these must have been infected before admission."

Incidental uses of the hospital.

But little difficulty has been experienced in Leicester in securing the removal to hospital of young children. Indeed, during 1878 and 1879, the admissions under 10 years of age have amounted to 72 per cent. of the total admissions.

Isolation of young children.

Ages of Patients admitted in 1878-79.

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					1878.	1879.
Under 1 year	...	...	...	...	0	4
1 year	...	...	...	...	1	6
2 years	...	...	...	...	4	26
3 years	...	...	...	...	9	29
4 years	...	...	...	...	8	30
5 years	...	...	...	...	6	27
6 years	...	...	...	...	6	30
7 years	...	...	...	...	5	16
8 years	...	...	...	...	3	18
9 years	...	...	...	...	1	10
10 years	...	...	...	...	4	8
					47	204
Above 10 years	...	...	...	...	30	65
Totals ...					77	269

The large number of children admitted in 1879 is especially striking, and I understand that it is mainly due to the reputation for comfort which the hospital has acquired in the borough; indeed, the personal persuasion of the inspectors of nuisances is, with but few exceptions, the only pressure that it is found necessary to bring to bear upon parents having dwellings which are deemed unfit for the treatment of infectious disease. In a few instances the assistance of the Medical Officer of Health is sought, and if a mother refuses to part with her child, she is always allowed to accompany it. Her stay is, however, often limited to two or three days, her return home being preceded by such measures of disinfection, &c. as are deemed necessary to prevent her being a means of spreading infection.

During the past two years some 12 parents in each year have thus come into the hospital with their children.

Visitors are not allowed on the hospital premises, unless special permission is granted, as in the case of grave illness. They can, however, always have news as to the welfare of their relations by inquiring at the lodge gate.

The only action taken under section 124 of the Public Health Act, 1875, has been in the case of two small-pox patients, who made no further objection to removal when they learned that the orders had been obtained.

In a few instances, as for example, in the case of domestic servants, payment for maintenance whilst in the hospital has been made on behalf of patients admitted, but the Sanitary Authority feel that any sums which they could recover from patients would be so trivial when compared with the expense incurred both in erecting and maintaining the hospital, that it was not worth while by making a charge to run the risk of hindering the use of the hospital so far as residents within the borough are concerned.

When cases are received from any other sanitary district, the cost of maintenance is charged. In one case only has this happened, namely, in 1878, when a case of scarlet fever was sent in by the Blaby Rural Sanitary Authority.

The cases received from the borough include paupers; they are not admitted into the ordinary wards, and their dress not being in any

Visiting of patients.

Section 124, Public Health Act, 1875.

Payments by patients.

Admission of paupers.



way distinctive of their status, no complaints have been made by other patients as to this arrangement.

The administrative and medical charge of the hospital, including the treatment of patients, is in the hands of Dr. Johnston; the remuneration attaching to these duties being included in that which he receives as Medical Officer of Health. The resident staff, which it is as a rule found necessary to maintain at the hospital, consists of a matron, three nurses, a cook, and a porter.

The original cost of the hospital was 7,230*l.*, of which a sum of 6,000*l.* was borrowed, the remainder being paid out of current rates. Roughly speaking, 6,230*l.* were paid for the erection of the buildings, and 1,000*l.* were expended on furniture, bedding, &c. The cost of maintaining the hospital, including salaries and wages, amounted to 280*l.* 17*s.* 1*d.* for the year ending March 1879, and 419*l.* 8*s.* 1*d.* for the year ending March 1880. In the first of these two years, however, a sum of 5*l.* 4*s.* 6*d.*, and in the second of 23*l.* 18*s.* 3*d.*, was repaid to the Sanitary Authority on behalf of patients.

The *Fever House* in connexion with the Leicester Infirmary forms part of one of the two-storied wings composing the infirmary, and at one end it adjoins and opens into the general wards. It is, however, separated from them by a double door and a lobby, which admits of some cross-ventilation. On both floors of the Fever House are two wards, separated by a well ventilated lobby, containing a bath room and lavatory, two sets of waterclosets, and a nurse's room. On the first floor the wards are 26 feet in length, 30 feet in breadth, and 16 feet in height. They each contain eight beds, there being some 98 feet of floor space and 1,560 cubic feet per bed. On the ground floor the wards are a trifle higher. All the wards are provided with four large double-hung sash windows, two in each opposite wall, surmounted by a pivot-hung window-frame, fitted outside with a louvred shutter. The pivot-hung frame falls open towards the ward, and reaches to within 2 feet of the ceiling. There are also air-grates above the floor-level. The wards are heated by means of open fire places having ventilators into the chimney shafts. In one ward the closets are badly placed and imperfectly ventilated. The connexion with the drains are also faulty.

The Fever House, though forming a part of the infirmary and having the same general and medical administration, is separately endowed, and admission to it is entirely free to any person in the county of Leicester who may be suffering from enteric fever. Twenty-one cases were under treatment at the date of my visit. The subjoined Table shows the several sanitary districts from which the patients have been received during the three years 1877-79:—

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Administration.  
Cost of construction and maintenance.

Leicester Fever House buildings.

Admission of patients.

Date.			Leicester Urban District.	Hinckley Urban District.	Belgrave Urban District.	Loughborough Urban District.	Market-Harborough Urban District.	Billesdon Rural District.	Blaby Rural District.	Hinckley Rural District.	Loughborough Rural District.	Lutterworth Rural District.	Market-Bosworth Rural District.	Market-Harborough Rural District.	Totals.
1877	...	...	35	2	1	—	—	—	2	5	3	1	1	3	53
1878	...	...	42	—	—	1	1	6	5	2	—	2	—	1	60
1879	...	...	11	—	—	—	—	6	—	—	—	1	—	—	18
1877-79	...	...	88	2	1	1	1	12	7	7	3	4	1	4	131

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In the borough of Leicester an effort is made by the Sanitary Authority to send all cases of enteric fever and simple continued fever needing isolation into the Fever House, and during the three years 1877-79 the total admissions from the borough have borne the relation to the total "fever" deaths registered which is shown in the following Table:—

				"Fever" Deaths Registered.	Admissions to the Fever House.
1877	...	...	...	20	35
1878	...	...	...	32	42
1879	...	...	...	21	11

There are ample recreation grounds for the patients in the fever louse; a wheeled and a hand ambulance, both holding a stretcher, are kept on the premises, and are lent free of charge, the patient's friends or the guardians paying horse hire if needed; and there is a separate "fever" mortuary.

*Leicester Corporation Act, 1879.*

Sec. 8.—In order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation who is suffering from any one or more of the following diseases, namely, small-pox, infectious cholera, scarlet fever, typhus fever, typhoid fever, erysipelas, puerperal fever, or diphtheria, the following provisions shall have effect (that is to say):—

1. If any such inmate be suffering from any such disease as aforesaid, the occupier or person having the management or control of such building, or (if such occupier or person be prevented by reason of such disease), the person in charge of such inmate shall, so soon as he shall become aware of the existence in any such inmate of any such disease, forthwith give notice to the Corporation at the Town Hall of the existence in such inmate of such disease:
2. If such inmate be not a member of the family of such occupier or person, the head of the family (resident in such building) to which such inmate belongs, or if there be no such head then such inmate (unless prevented by reason of such disease or of youth) shall, on becoming aware of the existence in such inmate or in his own person, as the case may be, of such disease, forthwith give notice thereof to such occupier or person:
3. The Corporation shall provide and supply gratuitously to every registered medical practitioner resident or practising in the borough, forms addressed and stamped for transmission through the post, for the certificate or declaration by such medical practitioner, of the particulars herein-after mentioned in relation to such cases according to the form set forth in the First Schedule to this Act:
4. Every medical practitioner attending on or called in to visit such inmate shall, on becoming aware that such inmate is suffering from any such disease as aforesaid, forthwith fill up, sign, and send to the Corporation at the Town Hall, a certificate or declaration stating according to the forms prescribed and supplied to him by the Corporation the name of such inmate, the situation of such building, and the name of such occupier or person, and the nature of the disease from which such inmate is suffering:
5. The Corporation shall pay to every medical practitioner who shall, in pursuance of this section duly make and give any such certificate or declaration a fee of two shillings and six pence for each such certificate or declaration, but only one such certificate need be given and only one such fee shall be payable within an interval of thirty days to the same medical practitioner for certificates given by him in respect of the same disease occurring in the same building:

And any person who shall wilfully offend against this enactment shall, for such offence, be liable to a penalty not exceeding ten pounds.



## FIRST SCHEDULE.

CERTIFICATE OF DISEASE, &c. UNDER LEICESTER CORPORATION  
ACT, 1879. SECTION 8.

TO THE CORPORATION OF THE BOROUGH OF LEICESTER.

Pursuant to the above-mentioned Act, I hereby certify and declare that in my opinion the under-mentioned person is suffering from a disease within the terms of such section.

Dated the \_\_\_\_\_ of \_\_\_\_\_ 188 .

(Signed) \_\_\_\_\_

Name of person suffering from }  
disease ... .. }  
Situation of the building wherein }  
such person is ... .. }  
Name of occupier or other person }  
having the charge, manage- }  
ment, or control of the build- }  
ing or room ... .. }  
Nature of the disease ... ..

NOTE.—This certificate must (under penalty of ten pounds in case of neglect) forthwith be sent to the Corporation at the Town Hall, and delivered to the official clerk or servant of the Corporation, who shall be found in attendance there, or be transmitted through the post.

## LEWES URBAN SANITARY DISTRICT.

Population in 1871, 6,010. Rateable value, 22,163*l.* 5*s.* 0*d.*

## LEWES RURAL SANITARY DISTRICT.

Population in 1871, 3,501. Rateable value, 24,130*l.* 12*s.* 0*d.*

## CLIFFE URBAN SANITARY DISTRICT.

Population in 1871, 1,600. Rateable value, 6,227*l.* 15*s.* 0*d.*

During the last five months of 1874, the town of Lewes, comprising the Lewes and the Cliffe Urban districts, together with the inhabited part of the Lewes rural district, was visited with a severe epidemic of enteric fever, which resulted by the end of the year in 486 attacks, of which 37 terminated fatally. During the course of the epidemic a temporary hospital was established at a house in the town, and the advantages attendant on this means of isolation were so marked that the sanitary authorities of the three districts, which have collectively an area of 6,444 acres, determined to erect a permanent hospital for infectious diseases. During the course of 1875 a site was determined on, plans were drawn up by Mr. Charles Rutley, architect, of Dowgate Hill, E.C., and they were submitted for the approval of the Local Government Board, who recommended the Public Works Loan Commissioners to lend to the Urban and Rural Sanitary Authorities the sums which they were to contribute towards the purposes of the hospital. The Cliffe Urban Authority preferred to pay its share of the cost out of funds in hand. The original cost of the hospital was divided between the three Authorities on the basis of the then rateable value of their respective districts.

Origin of the hospital.

The hospital premises stand on the southern slope of the Chalk Site and soil.

\* Now included in the recently formed borough of Lewes.

## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Hospital  
buildings.

Capacity of  
wards.

Ventilation,  
windows, &c.

Capacity of  
"isolation  
wards."

Downs, in a completely isolated position, just outside and to the north-west of the town. The site, which was originally characterised by steep undulations, is three-eighths of an acre in extent. It has been levelled so as to form three terraces one above the other; a deep valley has been filled in so as to secure an approach from the roadway adjoining; and the ground round the hospital buildings has been neatly laid out as a garden. On the lower terrace stands the principal building. It consists of a ward-pavilion, neatly constructed of red brick with a tile roof, and having its opposite side windows facing north-east and south-west respectively. The walls consist of two layers of  $4\frac{1}{2}$ -inch brickwork and an intervening 4-inch cavity. This pavilion contains two wards, one for males and one for females, the wards being separated by two rooms and a passage in the centre of the block. One room is a nurse's room having fixed windows into each ward, the other is a bath-room fitted with a movable bath and lavatories, and the passage leads from one ward to the other, and also into an entrance lobby communicating, by means of a covered passage under which an ambulance can drive, with the administrative block which occupies the next terrace to the rear. Both the wards measure 24 feet by 24 feet, and are about  $15\frac{1}{2}$  feet in height. According to the plans, they appear originally to have been designed to contain four beds each, with 144 square feet and somewhat over 2,000 cubic feet per bed, but at the date of my visit they each contained 6 beds. The wards are well lighted and well ventilated. They have each six double-hung sash windows, with an additional frame above opening towards the ward. The windows are, as already stated, situated in the opposite side walls so as to secure a cross current of air, they are so placed as to insure ample light in all the four corners of the wards, and they each have 24 square feet of surface, or in all at the rate of about one square foot to every 60 feet of cubic space. There is also in each ward a circular pivot hung window at the external end, two air grates a little above the floor level on either side, and two "Tobin tubes." One open fireplace suffices to maintain a fairly equable temperature throughout the ward. At the further end of each ward, and separated from it by a lobby, is a ward-sink, and also an earth-closet, the pail beneath the latter being daily removed by means of an opening outside whenever the ward is in use. Both the lobby and the chambers containing the closet and sink are provided with independent means of cross-ventilation. The wards are neatly furnished and are very cleanly and comfortable in appearance. One ward was furnished by private effort. The bedsteads are iron ones, with canvass stretched across them; the beds, specially selected on account of the facilities for destroying them without incurring much cost, consist simply of carefully selected oat chaff in bedticks, which when covered by blankets appear to be exceedingly comfortable. (See Plates, Nos. XVIII. and XIX.)

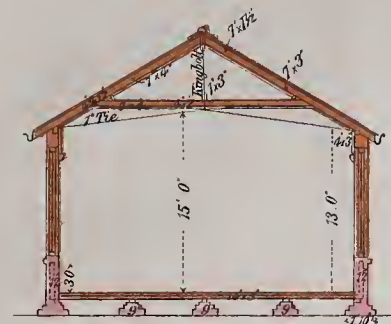
The "administrative block" which is situated to the rear of the ward pavilion, and on a terrace at a higher level, is constructed of the same materials as the ward-pavilion. It is divided down the centre from the front to the rear by a passage having a doorway and means of ventilation at either end. On one side of this passage are a well-lighted and well-ventilated "convalescent" or "isolation" ward measuring some 4,600 cubic feet, and two small bedrooms for convalescents, or for parents accompanying sick children, each room containing nearly 1,600 cubic feet. On the other side lie a kitchen and a bedroom for the caretaker and his wife, a surgery, a scullery, and a larder. Behind this block is a third terrace at a still higher level. This terrace is intended for the construction of additional wards, temporary or permanent, at any time when they may be needed.



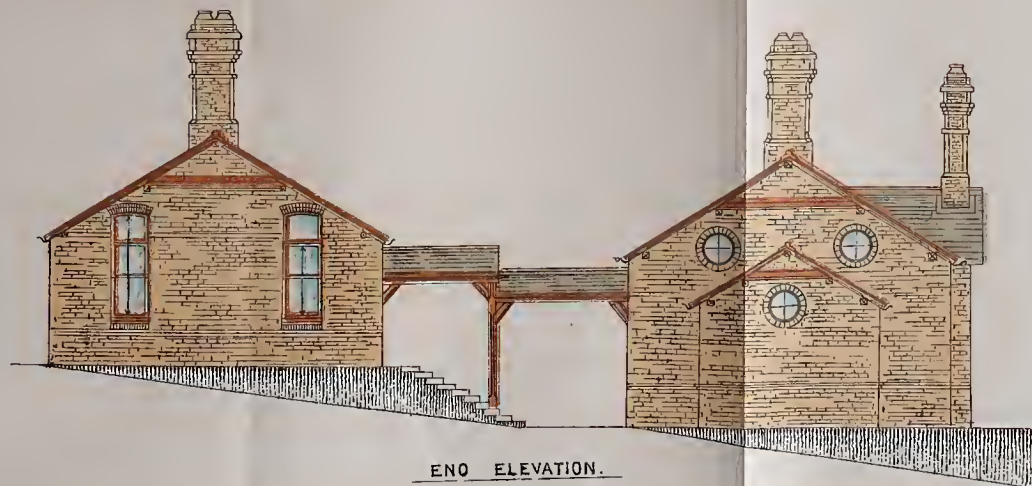
PLANS OF FEVER HOSPITAL, LEWES, SUSSEX.



FRONT ELEVATION HOSPITAL BUILDING.  
FACING SOUTH WEST.



SECTION.



END ELEVATION.

SCALE 12 FEET TO 1 INCH.

CHARLES & FRANK RUTLEY.  
ARCHITECTS.  
11, DOWGATE HILL, E.C.





# LEWES DISTRICT HOSPITAL

BLOCK PLAN SHEWING DRAINS.

SCALE 16 FEET TO AN INCH.

SITE FOR SECOND PAVILION

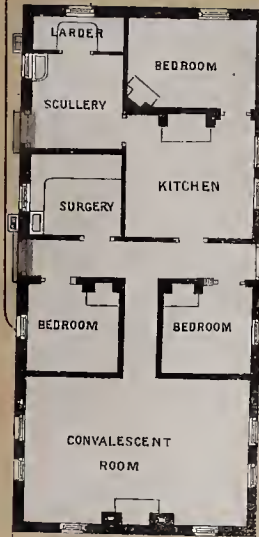
PLANTATION



R. W. DRAIN 4"

R. W. TANK

WASTE WATER DRAIN



MALE WARD

BATH ROOM

NURSES ROOM

FEMALE WARD

LOBBY

E.C. LAVTY

PLANTATION

WASTE WATER DRAIN 6"

B.

CESSPOOL

SITE FOR SECOND PAVILION

LINE OF ROAD

ADMINISTRATIVE BLDGS

LINE OF ROAD

HOSPITAL BUILDINGS

LEVEL 7 FT ABOVE ROAD

LINE OF ROAD

## SECTION A.B.

CHARLES & FRANK RUTLEY,  
ARCHITECTS,  
11 DOWGATE HILL, E.C.

to face page 134





A detached building to the east contains an ambulance shed, a mortuary, a laundry and wash-house, a "disinfecting room," in which articles are exposed to the vapour of burning bisulphide of carbon, an earth-closet, and stores for dry earth, coal, wood, &c. The ambulance is merely a brougham, not even stripped of its cloth linings; it is stated to be "disinfected" after each use.

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Ambulance; disinfection, &amp;c.

Water-supply, drainage, &amp;c.

Joint Committee of Management.

General administration;

Admission of patients.

Social status of patients.

Repayments to Sanitary Authorities.

A constant service of water is laid on from the mains of the Lewes Waterworks Company, and rainwater is collected in a large underground tank. The drainage is into a cesspool, which is provided with means of ventilation. There is no communication between the interior of any of the buildings and the drains leading to this cesspool. Gas has, as yet, not been laid on, oil-lamps being used throughout the buildings.

For the purposes of the management of this hospital, a joint agreement, under seal, was entered into by the three authorities for the appointment of a joint committee, consisting of members of the Sanitary Authorities. This Committee is empowered, amongst other things, to obtain the requisite nurses and medical attendance, to provide medicines and regulate the admission of patients; the contributions of the constituent bodies towards the current expenditure being based on the rateable value of their several districts. The "Hospital Committee" thus constituted consists of four members from the Lewes urban, four from the Lewes rural, and three from the Cliffe urban districts. Under the supervision of this committee, Mr. J. G. Braden, Medical Officer of Health for the three sanitary districts, has a general administrative charge of the hospital, no remuneration being assigned to this duty. As yet it has not been found necessary to provide any medical attendance, all the patients having hitherto been under the medical care of private practitioners of their own choice, and at their own cost. The care-keeper and his wife are engaged on the understanding that they should, when necessary, devote their whole time to the requirements of the hospital, the wife acting as nurse. As yet, however, it has never been necessary to demand all the time of the carekeeper himself, who follows the occupation of a bricklayer, and who says that his residence at the hospital has never interfered with his securing first-class work. Whilst the hospital is empty this man and his wife receive 10s. a week, together with fuel and light; the weekly wage being raised to 12l. a week, together with extra assistance, if necessary, when patients are under treatment. They are, however, always expected to find their own board.

Since the hospital was opened in May 1877, the following cases of infectious disease have been admitted:—

—				Scarlet Fever.	Enteric Fever.
1877	...	...	...	2	—
1878	...	...	...	1	1
1879	...	...	...	4	—

Of the eight patients admitted in the three years, 1877-79, one was a policeman's child; one a baker's child, the patient in this instance being accompanied in the hospital by its mother; one was a shop assistant; one a labourer; two were domestic servants; and two the children of a seaman.

With the exception of one case, in which the patient died leaving his family in a state of poverty, a charge has invariably been made by the Committee at a rate varying from 5s. to 10s. a week, according to the

circumstances of the patients. Paupers are not admitted, there being means of isolation for this class of the population at the workhouse.

As yet, therefore, no cases have been intentionally admitted at the public cost, although it is admitted that were it not for the payment demanded, persons dependent for their livelihood upon daily and weekly wages would allow members of their families, now treated at their own homes, to be removed to the hospital for the purposes of isolation when suffering from infectious diseases. The number of such cases really calling for isolation are, however, stated to have been very few since 1877; indeed in one instance only it is considered that the circumstances were such as would have warranted compulsory removal under section 124 of the Public Health Act, 1875. The parent in this case refused to allow of the removal of a child suffering from scarlet fever, but it was not considered advisable to take any action under that section.

Apart, however, from the isolation of persons actually suffering from infectious diseases, the hospital has in several instances been most usefully employed for the purposes of "quarantine," as in the case of children dismissed from schools in which scarlet fever has appeared, or, as in one instance, of a governess returning to the duties in Lewes from a house where the same disease was found to have prevailed. The payment demanded both in these cases and in the case of actual patients, has in no instance exceeded the actual expenses incurred above and beyond the permanent establishment charges; but in one instance a donation was, in addition, presented to the Hospital Committee.

The original cost of the hospital was 1,975*l.* 9*s.* 1*d.* The actual cost of the building, including furniture, fittings, ambulance, &c., was as nearly as possible, 1,500*l.*, the remaining sum of about 475*l.* being spent in excavations necessary in consequence of the peculiar character of the site, and in filling up a deep hollow for the purposes of a roadway. It was originally expected that a sum of 1,866*l.* would suffice for the erection of the building, &c., and towards this the Lewes Urban Authority contributed 846*l.*, the Lewes Rural Authority 870*l.*, and the Cliffe Urban Authority, 150*l.* An annual rent-charge of 18*l.* 10*s.* 0*d.* is paid by the authorities for the site; this, however, may be redeemed, if desired, by the purchase, within 21 years, of consols to the amount of 616*l.* 13*s.* 4*d.*

The annual expenses incurred in 1878, in addition to the rent-charge, were 105*l.* 11*s.* 10*d.* This sum, however, included 8*l.* 9*s.* 0*d.* for additional work to the outside walls, the fire insurance premium for 1877 amounting to 17*s.* 3*d.*, as well as that for 1878, and a sum of 7*l.* 11*s.* 2*d.* standing over for legal expenses. The remaining items, amounting in all to 84*l.* 11*s.* 11*d.*, were as follows:—

	£	s.	d.
Petty expenses, printing, and sundries	-	-	1 0 3
Fire insurance	-	-	0 17 3
Furniture	-	-	8 2 7
Coals and firewood	-	-	18 19 0
Hospital sundries	-	-	10 5 1
Rates and taxes	-	-	4 10 0
Patients' maintenance	-	-	4 6 3
Wages to hospital keeper, &c.	-	-	26 0 0
Clerk's salary	-	-	12 12 0
Honorarium to clerk	-	-	2 2 0
			<hr/>
			£88 14 5
Refunded by patients	-	-	4 2 6
			<hr/>
Total	-	-	£84 11 11

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Section 124,  
Public Health  
Act, 1875.

Incidental uses  
of hospital.

Cost of con-  
struction, &c.

Cost of main-  
tenance.



## LONDON.

APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

ON the DISTRIBUTION of CASES of "FEVER" in the IMMEDIATE NEIGHBOURHOOD of the LONDON FEVER HOSPITAL, Liverpool Road, Islington, by SHIRLEY F. MURPHY, Medical Officer of Health, St. Pancras, and late Resident Medical Officer, London Fever Hospital.

Mr. Shirley  
Murphy's  
Report.

The reports of the London Fever Hospital show that the hospital began its existence at No. 2, Constitution Row, Gray's Inn Lane, in 1802, "to the great horror of its neighbours who threatened indictment and prepared for litigation." Constitution Row was then in the midst of fields, but the "House of Recovery," as the hospital then was called, was one of a row of houses and "in contact with houses on each side." The neighbours were unable (the reports testify) to demonstrate any mischief done to them by the hospital, and after a short time their complaints were no more heard of, and the house continued to be used as a fever hospital until 1815, when from the necessity of increased accommodation the western building belonging to the old small-pox hospital, King's Cross, took the place of the building in Constitution Row.

In 1848 the Great Northern Railway required the ground on which the hospital stood at King's Cross, and in 1849 the institution, which had been built at Islington from funds received as compensation from the Great Northern Railway, was opened for the reception of fever cases.

An examination of the reports of the hospital from 1829 until the present time fails to show that there was ever any complaint against the institution on the part of its neighbours. The following account gives such information as I have been able to obtain concerning disease in the neighbourhood of the hospital since the institution was removed to Islington.

In Islington the London Fever Hospital is bounded on the north by Theberton Street, one side of Gibson Square, and by Theberton Street West; on the south by Barford Street; on the east by Charles Street, Prospect Place, and Providence Place; on the west by Liverpool Road.

The accompanying map will serve to show the relation of the hospital to the houses of these streets. (See Plate No. XX.)

The hospital when first built in 1849 consisted of, (a) certain wards on the ground floor, namely: Wards I., II., III., IV., V., VI., VII., and VIII.; Wards I. and II., as also Wards III. and IV., being in each case practically one ward divided down the centre with a partition 8 feet in height; (b) four upper storey wards, one over each of Wards I., IV., V. and VI.

In 1863 Ward IX. was built. In 1864 Ward X. was built. Both these wards were divided down the centre by an 8-foot partition.

In 1869 the hospital was further increased by the addition of temporary buildings between Wards IX. and X.

In 1871 Ward IX. and the temporary buildings were pulled down.

Since then the hospital has remained without any but internal alterations.

The distance between the different wards and the surrounding houses can be easily seen in the plan, but the following measurements will perhaps make these distances more easily appreciated.

Ward IV. lies nearly parallel to the boundary wall of the gardens of Barford Street, the distance of the ward from the boundary wall at the west end being  $31\frac{1}{2}$  feet, and at the east end  $26\frac{3}{4}$  feet.

APP. NO. 1.

On the Use and  
Influence of  
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Dr. Thorne.

The distance of the houses from the boundary wall is about 28 feet, that opposite the east end of Ward IV. being  $27\frac{1}{2}$  feet, while the projecting watercloset reduces the distance to 23 feet; at this point the ward is  $54\frac{1}{4}$  feet from the windows of the house, or  $49\frac{3}{4}$  feet from the watercloset window.

The distance of the projecting lavatory of Ward X. from the boundary wall opposite No. 11, Barford Street, is  $21\frac{5}{8}$  feet, the distance of this wall from the house 27 feet, or from the projecting watercloset 14 feet, which gives as the distance of the lavatory from the house  $48\frac{5}{8}$  feet, or from the watercloset  $35\frac{5}{8}$  feet.

From that part of Ward X. opposite No. 14, Barford Street, the distance to the boundary wall of this house is  $33\frac{3}{4}$  feet, or to the house  $60\frac{1}{4}$  feet, or to the projecting watercloset  $45\frac{1}{2}$  feet.

From the south-east corner of Ward X. to the projecting watercloset of No. 28, Charles Street, the distance is  $28\frac{2}{3}$  feet. From the east end of Ward X. to the east boundary wall of the hospital the distance is  $57\frac{5}{8}$  feet. The distance of the east boundary wall of the hospital to the houses in Prospect Place is  $39\frac{1}{2}$  feet; the privies of these houses are still nearer this wall, being only 24 feet distant from the hospital boundary wall.

From the north-east corner of Ward I. the distance to the boundary wall is  $32\frac{1}{2}$  feet, to the watercloset of the opposite house 71 feet, and to the house proper 84 feet.

From the north-west corner of Ward I. to the boundary wall the distance is  $23\frac{1}{2}$  feet, to the watercloset of the opposite house  $66\frac{1}{2}$  feet, and to the house proper  $78\frac{1}{2}$  feet.

From Wards V. and VI. to the west boundary in Liverpool Road the distance is 88 feet.

The other buildings had been pulled down before I had any official connexion with the institution, and I am not therefore able to give any measurements of the distance of those buildings from the surrounding houses.

Ward IX., however, is marked on the Ordnance Map as about 100 feet from the houses in Gibson Square and Theberton Street.

Although it has been found impossible to obtain a census of the number of persons in the houses surrounding the hospital, it may be stated generally that the majority of these houses are occupied by more than one family.

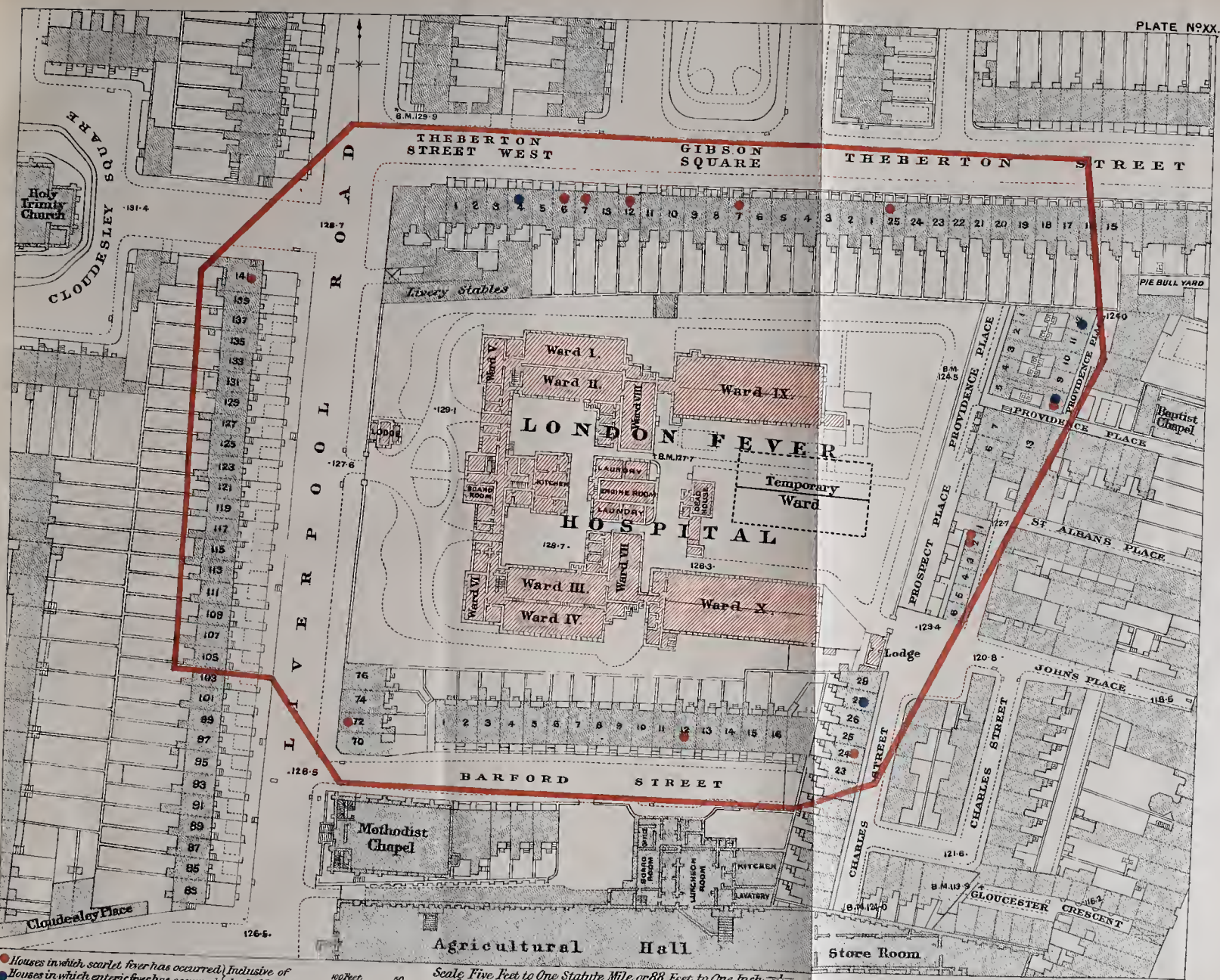
The accompanying Table A. shows the different diseases treated in the hospital each year, and the number of persons suffering from them who were admitted into the institution:—

TABLE A.

NUMBER of PATIENTS admitted into the LONDON FEVER HOSPITAL,  
Liverpool Road, Islington.

During the Years.	Typhus Fever.	Enteric Fever.	Scarlet Fever.	Relapsing Fever.	Other Diseases.	Total Admissions
1850 ... ..	129	128	59	—	128	544
1851 ... ..	59	209	57	224	328	877
1852 ... ..	202	140	135	88	308	873
1853 ... ..	408	210	100	16	336	1,070
1854 ... ..	336	229	238	5	344	1,152
1855 ... ..	313	218	158	—	307	1,026
1856 ... ..	1,061	149	183	—	368	1,761





● Houses in which scarlet fever has occurred (Inclusive of  
 ● Houses in which enteric fever has occurred) doubtful cases  
 The red line encloses the houses included in the enquiry  
 to face page 158.

Scale Five Feet to One Statute Mile or 68 Feet to One Inch  
 120 240

240 Feet

E. Waller & Grahams, Ltd Litho London. 1267.5.01.





During the Years				Typhus Fever.	Enteric Fever.	Scarlet Fever.	Relapsing Fever.	Other Diseases.	Total Admissions.	APP. NO. 1. On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.
1857	...	...	...	274	214	85	1	327	901	
1858	...	...	...	15	180	118	—	234	547	
1859	...	...	...	43	176	171	—	198	593	
1860	...	...	...	25	94	96	—	176	391	
1861	...	...	...	86	161	173	—	226	646	
1862	...	...	...	1,827	220	182	—	470	2,699	
1863	...	...	...	1,319	172	268	—	575	2,110	
1864	...	...	...	2,497	252	284	—	577	3,610	
1865	...	...	...	1,961	520	247	—	627	3,355	
1866	...	...	...	1,735	575	240	—	1,027	3,577	
1867	...	...	...	1,383	378	240	—	800	2,801	
1868	...	...	...	1,971	461	399	3	823	3,657	
1869	...	...	...	1,260	368	614	769	400	3,411	
1870	...	...	...	631	595	912	903	446	3,437	
1871	...	...	...	411	308	268	69	268	1,324	
1872	...	...	...	8	44	68	—	62	182	
1873	...	...	...	10	61	45	—	51	167	
1874	...	...	...	20	77	207	—	80	384	
1875	...	...	...	8	68	525	—	109	710	
1876	...	...	...	23	87	516	—	104	730	
1877	...	...	...	8	106	385	—	130	629	
1878	...	...	...	5	101	417	—	112	635	
1879	...	...	...	7	69	594	—	147	817	
1880	...	...	...	3	75	598	—	211	887	

With a view to showing the number of persons suffering from the different fevers in the hospital at one time Table B. has been compiled. It is a matter for regret that the records of the hospital only show these numbers for the end of each year.

TABLE B.

NUMBER of PATIENTS remaining in HOSPITAL on December 31st of  
the following Years.

Years.							Continued Fever.		Scarlet.
1850	...	...	...	...	...		40		1
1851	...	...	...	...	...		78		4
1852	...	...	...	...	...		91		17
1853	...	...	...	...	...		43		7
						Typhus.	Enteric.	Relapsing.	
1854	...	...	...	...	...	14	12	—	17
1855	...	...	...	...	...	56	31	—	6
1856	...	...	...	...	...	61	8	—	10
1857	...	...	...	...	...	2	33	—	3
1858	...	...	...	...	...	—	9	—	5
1859	...	...	...	...	...	—	7	—	18
1860	...	...	...	...	...	—	9	—	5
1861	...	...	...	...	...	18	14	—	16
1862	...	...	...	...	...	67	13	—	10
1863	...	...	...	...	...	119	16	—	21
1864	...	...	...	...	...	168	12	—	17
1865	...	...	...	...	...	113	93	—	13
1866	...	...	...	...	...	106	49	—	9

APP. NO. I.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Years.						Typhus.	Enteric.	Relapsing.	Scarlet.
1867	...	...	...	...	...	100	38	—	27
1868	...	...	...	...	...	163	34	—	44
1869	...	...	...	...	...	33	38	250	60
1870	...	...	...	...	...	49	52	26	54
1871	...	...	...	...	...	5	20	—	10
1872	...	...	...	...	...	—	3	—	—
1873	...	...	...	...	...	2	3	—	4
1874	...	...	...	...	...	1	14	—	38
1875	...	...	...	...	...	3	11	—	103
1876	...	...	...	...	...	1	18	—	73
1877	...	...	...	...	...	1	15	—	52
1878	...	...	...	...	...	—	13	—	72
1879	...	...	...	...	...	1	3	—	108
1880	...	...	...	...	...	—	4	—	71

Table C., however, shows the total number of patients in the hospital at the end of each month from 1862-1870 inclusive. The number of cases of the different diseases in the hospital at these times can be roughly estimated from the proportion which these diseases bear to each other in Table A.

TABLE C.

TOTAL NUMBER of PATIENTS in the LONDON FEVER HOSPITAL on the last day of the following Month.

Month.				1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.
January	...	...	...	276	139	218	207	252	191	190	230	369
February	...	...	...	136	125	198	213	199	155	204	218	282
March	...	...	...	151	103	181	223	224	176	160	196	217
April	...	...	...	161	100	184	161	181	146	185	178	201
May	...	...	...	161	79	188	150	146	139	185	146	141
June	...	...	...	147	65	161	150	129	128	171	137	162
July	...	...	...	116	61	173	123	113	121	167	106	164
August	...	...	...	123	80	192	145	152	133	235	144	201
September	...	...	...	115	139	202	156	160	157	260	191	248
October	...	...	...	129	147	220	197	199	217	293	225	257
November	...	...	...	148	188	218	256	204	237	297	310	52
December	...	...	...	103	166	220	240	214	193	248	391	203

There were then during the latter years for many months together as many as from one to two hundred persons suffering from typhus continually in the hospital.

During the last two or three months of 1869 and the first few months of 1870 there were from two to three hundred cases of relapsing fever.

The number of cases of scarlet fever have varied greatly, but it may be stated that during the last six years about 80 cases have, as a rough



average, been treated in the hospital at one time, this number increasing in the autumn months during the last year or two, to about 100.

The manner in which these diseases were distributed is a matter of interest, and it should therefore be stated that persons suffering from the different fevers were not separated from each other until the year 1862, and that therefore the Wards I., II., III., IV., V., and VI. have contained at the same time persons suffering from typhus, enteric, and scarlet fever.

In 1862 the different fevers were classified, and were thus distributed. Cases of typhus were placed along the outer walls of wards I., II., III., and IV., while enteric fever patients, together with cases of measles, &c., and such non-infectious cases as came to be admitted, were placed on either side of the central partition. Scarlet fever cases were treated in Wards V. and VI., and in the upper wards over Nos. I. and IV. Wards VII. and VIII. appear to have been reserved solely for typhus.

When Ward IX. came to be erected in 1863, and Ward X. in 1864, typhus and enteric fever were in the first instance distributed as in Wards I., II., III., and IV. Subsequently, at any rate from 1867 or thereabouts, Wards IX. and X. were reserved for cases of typhus only, and Wards I., II., III., and IV. for cases of enteric fever and the non-infectious diseases. The cases of scarlet fever remained as before.

After 1869, when the prevalence of typhus subsided, and relapsing fever increased, Wards IX. and X. and the new temporary buildings were devoted wholly to relapsing fever; whilst typhus was treated in Wards VII. and VIII.

During 1870 the Metropolitan Asylums Board undertook the care of all persons suffering from infectious diseases who were paupers, and Ward IX., together with the temporary structures mentioned, were pulled down, and the hospital devoted to the reception of infectious persons who were above the pauper class.

From 1871 to 1874 inclusive, the distribution of cases varied, but from 1875 to 1879 it has been as follows:—

Wards I., II., III., and IV. and the upper-storey wards above Wards I. and IV. have received scarlet fever cases.

Wards V. and VI. and the wards above them had been divided into private rooms, and have separately received scarlet and enteric fever cases.

Wards VII. and VIII. have contained cases of enteric fever.

Ward X. was reserved for the few cases of typhus which were admitted.

Since the close of the year 1879, Wards I., II., III., IV., VII., and VIII. and the upper-storey wards over Wards I. and IV. have received scarlet fever cases only.

Wards V. and VI. and the wards over them have mostly received scarlet fever and, when not otherwise occupied, a few enteric fever cases.

It is impossible to tell the history of every house in the immediate neighbourhood of the hospital since 1850, and I am indeed obliged to limit my statement to such histories as were given me in these houses since I became associated with the institution as its resident medical officer in 1875. During the  $3\frac{1}{2}$  years I held this office, opportunities presented themselves from time to time for learning whether any fever existed in the surrounding houses, and in 1878 I made a special inquiry at the majority of these houses with this object.

This inquiry has been recently repeated and the results of the two inquiries will be found in Table D. No other cases were ever heard of than those shown in this Table.

TABLE D.

APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne

Street and Number of House.	Inquiry conducted June 1878.			Inquiry conducted June 1881.	
	Period of Time to which the Statement of Informant related.	Cases of Fever occurring in the House during this Period.		Period of Time to which the Statement of Informant related.	Cases of Fever occurring in the House during this Period.
Barford Street :					
1 ... ..	7 years	None	... ..	10 years	None.
2 ... ..	18 "	"	... ..	21 "	"
3 ... ..	6 "	"	... ..	9 "	"
4 ... ..	12 "	"	... ..	15 "	"
5 ... ..	6 "	"	... ..	8 weeks	"
6 ... ..	3½ "	"	... ..	4 "	"
7 ... ..	5 "	"	... ..	2½ years	"
8 ... ..	18 "	"	... ..	21 "	"
9 ... ..	4½ "	"	... ..	2½ "	"
10 ... ..	18 "	"	... ..	2 "	"
11 ... ..	2 "	"	... ..	2 "	"
12 ... ..	½ "	Several cases of scarlatina in house stated to be due to the introduction of a child who had recently suffered from the disease.		3 "	"
13 ... ..	13 "	None	... ..	16 "	"
14 ... ..	3 "	"	... ..	5 "	"
15 ... ..	11 "	"	... ..	14 "	"
16 ... ..	No inquiry.	—		Only recently come into house.	
Theberton Street West :					
1 ... ..	20 years	None	... ..	23 years	"
2 ... ..	20 "	"	... ..	¾ "	"
3 ... ..	½ "	"	... ..	2½ "	"
4 ... ..	No inquiry.	—		10 "	One case of enteric fever.
5 ... ..	"	—		22 "	None.
6 ... ..	"	—		50 "	One case of scarlatina eight or nine years ago.
7 ... ..	14 years	None	... ..	17 "	Doubtful case of scarlatina two years ago.
Gibson Square :					
13 ... ..	2½ "	"	... ..	5 "	None.
12 ... ..	6 "	"	... ..	9 "	Two years ago six children had scarlatina.
11 ... ..	5 "	"	... ..	8 "	None.
10 ... ..	14 "	"	... ..	17 "	"
9 ... ..	10 "	"	... ..	Only recently come into house.	
8 ... ..	25 "	"	... ..	28 years	"
7 ... ..	18 "	Five cases of scarlatina 11 years ago, all occurring together		21 "	None but those mentioned.



On the Use and  
Influence of  
Hospitals for  
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Diseases, by  
Dr. Thorne.

Street and Number of House.	Inquiry conducted June 1878.			Inquiry conducted June 1881.	
	Period of Time to which the Statement of Informant related.	Cases of Fever occurring in the House during this Period.		Period of Time to which the Statement of Informant related.	Cases of Fever occurring in the House during this Period.
Gibson Square :					
6 ... ..	3½ years	None	...	1½ years	None.
5 ... ..	4 "	"	...	7 "	"
4 ... ..	6 "	"	...	2 "	"
3 ... ..	No inquiry	...	...	2 "	"
2 ... ..	"	...	...	2 "	"
1 ... ..	"	...	...	13 "	"
Theberton Street :					
25 ... ..	"	...	...	10 "	One case of scar- latina six years ago.
24 ... ..	"	...	...	3 months	None.
23 ... ..	"	...	...	12 years	"
22 ... ..	"	...	...	9 months	"
21 ... ..	"	...	...	3 years	"
20 ... ..	"	...	...	20 "	"
19 ... ..	"	...	...	8 "	"
18 ... ..	"	...	...	11 "	"
17 ... ..	"	...	...	15 months	"
16 ... ..	"	...	...	8 years	"
15 ... ..	"	...	...	3 months	"
Prospect Place :					
1 ... ..	"	...	...	16 years	"
2 ... ..	"	...	...	16 "	Two or three years ago one case of scarla- tina; and one year ago a second case.
3 ... ..	"	...	...	8 months	None.
4 ... ..	"	...	...	2 years	"
5 ... ..	"	...	...	16 "	"
6 ... ..	"	...	...	7 "	"
Charles Street :					
23 ... ..	15 years	None	...	18 "	"
24 ... ..	2 "	One doubtful case of scarlatina.	...	6 months	No other case.
25 ... ..	20 "	None	...	13 years	None.
26 ... ..	9 "	"	...	12 "	"
27 ... ..	6 "	One case of enteric fever.	...	9 "	No other case.
28 ... ..	7 months	None	...	1 "	None.
Liverpool Road :					
70 ... ..	No inquiry	...	...	13 "	"
72 ... ..	"	...	...	11 "	Two years ago one case of scarla- tina, believed to have been caught at school; other cases existed in the school at the same time.

## APP. NO. 1

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Street and Number of House.	Inquiry conducted June 1878.			Inquiry conducted June 1881.	
	Period of Time to which the Statement of Informant related.	Cases of Fever occurring in the House during this Period.		Period of Time to which the Statement of Informant related.	Cases of Fever occurring in the House during this Period.
Liverpool Road :					
74 ... ..	No inquiry	...	...	3 months	None.
76 ... ..	"	...	...	6 "	"
105 ... ..	"	...	...	20 years	"
107 ... ..	"	...	...	4 "	"
109 ... ..	"	...	...	No infor- mation could be obtained.	"
111 ... ..	"	...	...	3 years	"
113 ... ..	"	...	...	9 "	"
115 ... ..	"	...	...	6 months	"
117 ... ..	"	...	...	9 "	"
119 ... ..	"	...	...	2 years	"
121 ... ..	"	...	...	2 "	"
123 ... ..	"	...	...	8 "	"
125 ... ..	"	...	...	12 "	"
127 ... ..	"	...	...	1 "	"
129 ... ..	"	...	...	10 "	"
131 ... ..	"	...	...	3 "	"
133 ... ..	"	...	...	4 "	"
135 ... ..	"	...	...	1½ "	"
137 ... ..	"	...	...	40 "	"
139 ... ..	"	...	...	2 "	"
141 ... ..	"	...	...	1¼ "	Four cases of scarlatina at the same time.
Livery stable next to hospital (north) in Liverpool Road.	"	...	...	12 "	None.
Providence Place :					
1 ... ..	28 years	...	...	31 years	"
2 ... ..	"	...	...	"	"
3 ... ..	"	...	...	"	"
4 ... ..	"	...	...	"	"
5 ... ..	"	...	...	"	"
6 ... ..	"	...	...	"	"
7 ... ..	"	...	...	"	"
8 ... ..	"	One case of scarla- tina 9 years ago. One case of enteric fever 25 years ago.		"	None but that mentioned.
9 ... ..	"	...	...	"	None.
10 ... ..	"	...	...	"	"
11 ... ..	"	...	...	"	"
12 ... ..	"	One case of enteric fever 25 years ago.		"	None but that mentioned.
13 ... ..	"	...	...	"	None.

From this Table it will be seen that the occupants of houses in Theberton Street West and 11, 12, and 13, Gibson Square, have lived within a distance of 78½ to 84 feet of wards occupied by typhus fever from 1863 to about 1867 inclusive, and by scarlet fever from 1871 to



1880. Those of 1-9, Gibson Square, have lived within 100 feet of wards occupied by typhus fever from 1863 to 1868 inclusive, and by relapsing fever from 1869 to 1871. The inhabitants of 4-8, Barford Street, have lived within 55 feet of wards occupied by typhus fever from 1863 to about 1867 inclusive, and by scarlet fever from 1871 to 1880. The inhabitants of 11-16, Barford Street, have lived within a distance of from 49 to 60 feet of wards occupied by typhus fever from 1864 to 1868 inclusive, and by relapsing fever from 1869 to 1871.

In addition to the above periods of time, it may be mentioned again that owing to the non-classification of the different fevers for the 12 years prior to 1862, a large number of persons suffering from all the fevers were at the same time received in Wards I., II., III., IV., V., VI., VII., and VIII., and the four upper-storey wards, and thus the inhabitants of the houses in proximity to these wards were living during all these years within the distances shown of wards occupied by cases of all the different infectious fevers.

The most striking point in connexion with the inquiry is that no evidence has been found that a single case of typhus has occurred in houses immediately surrounding a hospital in which 18,073 cases of typhus have been treated in 30 years, and in which there were for many winters as many as from one to two hundred persons suffering from this disease at one time, although the inhabitants of many of these houses lived within a distance varying from 49 to 84 feet, or, if we include the waterclosets, of from 36 to 71 feet of the sufferers, and the windows of the houses and of the wards have been opposite to each other.

The gardens of these houses are within a distance varying from 22 to 32½ feet of the occupied wards, and it is impossible to doubt but that during many years a large number of the inhabitants must have frequently been within this distance of them, yet not the least evidence remains of a single person contracting typhus.

It is also of interest to observe that no case of relapsing fever was heard of during the epidemic of this disease, although the inhabitants of some of the houses of Barford Street lived within 49 to 60 feet of a ward which contained for several months not far short of 100 persons suffering from relapsing fever.

If typhus or relapsing fever had been found in these houses, there would be a strong probability of the hospital having been concerned in the production of such disease. But the same absence of cases cannot be expected with regard to scarlet fever. That some amount of scarlet fever should exist is only what must be expected in every district of London, and the only question for consideration is whether there has been any special prevalence of this disease in the neighbourhood of the hospital.

Table D. shows that no such special prevalence has existed. Thus the first eleven houses in Barford Street nearest and parallel to Wards III. and IV. have wholly escaped, although during the last 10 years these wards have been occupied by scarlet-fever cases, and contained during the last six years constantly from 25 to 28 patients. Several of these houses are within 55 feet of the wards.

The houses in Theberton Street West and Nos. 11, 12. and 13, Gibson Square, are parallel to and within 84 feet of wards which for the last 10 years have been occupied by the same number of scarlet fever patients.

The only cases which can be heard of are :

One case of scarlet fever eight or nine years ago.

One doubtful case of scarlet fever two years ago.

Six cases occurring at one time in one house two years ago.



As a result of the whole inquiry the number of cases of scarlatina which could be heard of in the houses more immediately surrounding the hospital premises, amounted only to 23, in addition to those which occurred at 12, Barford Street. The number of the latter is not known, but it may be assumed that the total number of cases of this disease in the 96 houses where inquiry was made does not amount to more than 30.

Estimating the population at the rate of six per house, a low estimate for the class of house surrounding the hospital, the population among which these cases occurred amounts to 576.

Whether 30 be above or below the number of cases which might be heard of in a corresponding London population not living near a fever hospital may be roughly judged of by the average number of deaths from this disease in London during the 10 years 1870-79. In this period the average annual number of deaths from scarlatina amounted to 2,574, and those deaths may be regarded as representing at least 10 times that number of attacks; that is, not less than 25,740 cases of scarlatina each year occurred in a mean population of 3,445,000, being at the rate of 7.5 cases per 1,000 of population per year. At this rate the population of the houses surrounding the hospital would have been expected to have in them 4.3 cases each year, and the 30 cases heard of would fairly represent the expected number of cases during the average tenancy of the London householder.

With regard to enteric fever the fact that but five cases could be heard of during either inquiry is sufficient evidence that the hospital had no influence in causing this disease in the houses immediately surrounding the hospital.

A limited number of cases of diphtheria and small-pox have been treated in the hospital, but although there is no evidence of these diseases having infected persons in the immediate neighbourhood, the cases have not been in sufficient numbers to warrant any deductions being drawn from them.

#### ST. PANCRAS VESTRY.

Provision of  
hospital  
marquees.

In April 1881 the St. Pancras Vestry secured a large field in an isolated position near a main road in the parish of Finchley, and erected some hospital tents for the reception of small-pox cases. The tents consisted of a number of Hospital Marquees provided by Messrs. Piggott Brothers, of 59, Bishopsgate Street Without, E.C., and resembling those described as having been used by the Newark Urban Sanitary Authority (see page 193). The floors were well raised above the surface of the ground by means of wooden joists, and each ward consisted of two marquees joined end to end. Other tents were provided for administrative purposes, and wooden buildings were erected to serve as a kitchen, laundry, &c.

On visiting the tents early in May I found that each pair of marquees contained 16 patients, the total floor space being 800 square feet, and the total capacity some 7,600 cubic feet. The canvas walls at each end of the ward were at that time quite open, and the patients, who were lying in full view of the foliage of a neighbouring plantation, spoke highly of the accommodation afforded them.

Warming and  
ventilation of  
hospital tents.

The air of the ward was also at that time perfectly sweet and inoffensive, and I was assured by Dr. G. C. Henderson, the resident medical officer, that with the existing arrangements for warming the tents, such an amount of air could, without draft, be admitted beneath the beds and by means of the roof ventilators, even when the canvas ends were quite closed either at night or during the cold weather, as to ensure



both a sufficient warmth, and reasonable sweetness, of the air in the wards.

When the marquees were first erected an effort had been made to warm them by means of paraffine stoves, but this was abandoned, not only on account of the danger attendant upon it, but because it was unsatisfactory in its results. Thus, with a minimum external temperature of 36° Fahr., and due regard being had to ventilation, it was found impossible to secure a higher temperature inside the tents than 46° Fahr. Since then, however, and acting on the advice of Dr. A. Ashby, Medical Officer of Health to the Grantham, Newark, and Sleaford Combined District, each marquee had been warmed by means of hot-water pipes, passing from a small heating apparatus fixed in a shed outside the tent, and being carried round the ward behind the line of beds. With this system of warming, and whilst maintaining ample ventilation, I am informed that the tents can be easily maintained at a temperature of 54° Fahr., when the outside air is as low as 35° Fahr.

APP. NO. 1.

On the Use and  
Influence of  
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Diseases, by  
Dr. Thorne.

#### MAIDSTONE URBAN SANITARY DISTRICT.

Population in 1881, 29,638. Rateable value, 98,911*l*.

In 1871 three two-storied cottages, forming part of a row of similar dwellings in Tufton Street, were rented by the Urban Sanitary Authority for the purposes of a hospital for infectious diseases, and later on a fourth one was also taken, the four cottages occupying the extreme east end of the street, and being situated in a part of the town which is somewhat thickly inhabited by the artizan class. To the north, and at the back of the cottages is a piece of garden ground belonging to them and measuring about 45 feet  $\times$  40 feet; to the south, and on the opposite side of the street, which measures 23 feet from house to house, is a row of cottages similar to the hospital cottages; to the east lie a roadway and some spacious gardens belonging to the West Kent General Infirmary; and to the west, one of the hospital cottages is in immediate contact with a cottage dwelling. The hospital cottages all communicate with each other on the ground floor, but the upper floors have no communication with each other. Seven rooms, containing 12 beds, are set apart as wards; two rooms are used as sitting rooms, one for patients and the other for the resident nurse; and there are two nurses' bedrooms, kitchen, storeroom, &c. The ward rooms are all ordinary cottage rooms with whitewashed walls; they have each a capacity of about 800 cubic feet, and are each provided with one double-hung sash window. There are open fireplaces in some of the rooms, none at all in others. Movable baths are also provided. A constant service of water is laid on from the town mains, and the premises are drained into the public sewers, there being no drain inlets indoors. Waterclosets are situated in the garden.

Hospital site  
and buildings.

There is no disinfecting apparatus in use, but the Sanitary Authority have procured one of the stoves designed by Dr. Ransom and manufactured by Messrs. Goddard and Massey of Nottingham, which will be erected as soon as a suitable site is determined on.

Disinfecting  
apparatus.

An old cab stripped of its lining is used as an ambulance. It belongs to a private individual who keeps it on his own premises. A payment of 10*s*. made to him each time it is used, is intended to cover its disinfection after use. There is no mortuary.

Ambulance,  
&c.

During the five years 1876-80, the number of patients admitted from the under-named infectious diseases, and the total deaths in the borough from the same causes have been as follows:—

Admissions to  
hospitals.

APP. NO. 1

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Date.	Small-pox.		Measles.		Scarlet Fever.		Diphtheria.		"Fever."		Other Diseases.	
	Deaths in Borough.	Admissions to Hospital.	Deaths in Borough.	Admissions to Borough.	Deaths in Borough.	Admissions to Hospital.	Deaths in Borough.	Admissions to Hospital.	Deaths in Borough.	Admissions in Hospital.	Deaths in Borough.	Admissions in Hospital.
1876	—	—	19	1	11	—	6	—	6	—	?	5
1877	—	—	14	—	6	—	2	—	12	2	?	3
1878	2	9	1	—	—	1	6	—	2	3	?	1
1879	—	—	1	2	5	7	—	—	4	1	?	—
1880	—	9	—	—	—	19	—	—	—	8	?	2
1876-80	2	18	35	3	22	27	14	—	24	14	?	11

From the above it will be seen that until 1878 the isolation of infectious diseases in this hospital was but little carried out. Since then, however, the cottages are stated to have been most useful in this regard

Measures adopted to secure isolation of patients.

Mr. M. Adams, F.R.C.S., the Medical Officer of Health, who holds several public appointments, limits his practice to consultations, and to this he mainly attributes the fact that he receives frequent and early intimation of the existence of cases of infectious diseases from other medical practitioners in the town. When any such cases are reported to have occurred amongst the poorer portions of the population, it is the practice to send a nurse from the hospital to assist in washing linen and to superintend any measures of disinfection which may have been recommended; she also at the same time always uses her personal influence to secure the removal of patients to the hospital, and in many cases, where no compulsory action could be taken, she succeeds. As soon as the removal is effected, the nurse returns to the infected house, she places all infected linen, &c. in boiling water, she assists the family in washing them, and also herself in many cases washes the floors, &c. with a disinfecting fluid. As a rule the Inspector of Nuisances follows and disinfects the rooms with the fumes of burning sulphur; he also exposes such articles as cannot be washed to the same operation.

Results of early isolation.

As the result of this action it should be noted that, since the date of Mr. Adams' appointment in November 1878, there has never been any spread of infection in any one of the many houses from which he has succeeded in removing the first patient attacked, and the hospital is hence deservedly described, in a special report, as having "had a marked influence" in preventing "the spread of infectious diseases in the borough."

Admission of young children.

Such difficulties as were at first met with in securing the admission of young children have practically disappeared, mothers now often consenting to their isolation on hearing the testimony of neighbours as to the comforts which other children enjoyed when in hospital. The only four patients under treatment at the date of my visit were children varying from two to four years of age; the removal of two of them having been due to such testimony as that referred to. Where, however, a mother refuses to part with her sick child whose isolation is deemed necessary for the public protection, she is always allowed to go into the hospital with the patient. Out of a total of 48 patients admitted



in 1879 and 1880, as many as 24 were children varying in age from one year to ten years.'

Both measles and scarlet fever, and also small-pox, enteric fever, and scarlet fever, have been treated in separate cottages at the hospital at one and the same time; communication between the several parts of the building being as much as possible prevented, and hitherto no spread of disease has taken place.

The general administration of the hospital is in the hands of Mr. Adams. Patients are as a rule attended at their own cost by medical practitioners of their own choice, but in a few instances, when they have obviously been poor, the Sanitary Authority have themselves called in the services of a private medical practitioner. The same plan has been adopted in the case of a few paupers who were admitted under circumstances of urgency.

Under ordinary circumstances patients are expected to repay to the Authority the actual cost of their maintenance whilst under treatment, but care is taken that no demand for payment shall deter the poorer inhabitants from entering the hospital. No action has ever been taken under section 132 of the Public Health Act, 1875, to secure such repayment.

Though no action has ever been taken under section 124 of the Public Health Act, 1875, it has been found necessary, in a few isolated instances, to inform the friends of persons suffering from infectious diseases that the authority had compulsory powers of removal to the hospital; but even this has been unnecessary in recent years, no case to which the section could have been applicable having arisen in which persuasion has not sufficed.

The Authority pay an annual rent of 39*l.* for the four cottages, and in addition to this, the cost incurred by them in connexion with the hospital during the three years 1876-78, was 123*l.* 12*s.* 2*d.*, 87*l.* 5*s.* 6*d.*, and 143*l.* 12*s.* 8*d.* respectively.

Owing to the position occupied by the hospital cottages with regard to surrounding houses, I made special inquiry as to whether any complaint had arisen with regard to the spread of infectious diseases to the inmates of other dwellings. At first I was assured that, although numerous complaints as to the locality of the hospital had been made, no such spread had ever been alleged, and even inquiry at two houses in Tufton Street, where small-pox had occurred in 1878 when cases of that disease were under treatment in the hospital, failed to elicit any suggestion to the effect that the hospital had been the source of infection. Indeed, it was generally supposed that the disease had been contracted at some paper mills, a member of each family attacked being engaged there in rag sorting.

Since my visit to Maidstone, however, Mr. Adams has made such careful and detailed inquiry into the circumstances of these attacks as was possible after so considerable a lapse of time, and the results of his investigations are as follows:—

One case of small-pox in a young man, named Cook, occurred at No. 31, Tufton Street, on 26th April 1878. This house is almost immediately opposite to the most westerly of the hospital cottages, and within some 30 feet only of the point where the ambulance bringing patients would stop at the hospital. Assuming the date of Cook's attack to be correct, he would probably have come into contact with the infection on or about the 13th of April, and it is noteworthy that two patients suffering from small-pox were taken to the hospital between April 10th and 12th. One previous small-pox patient had also been admitted on April 3rd. Cook, it is true, worked amongst rags, but as a

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Simultaneous treatment of several diseases.

General and medical administration.

Repayments to the Sanitary Authority.

Sect. 132 Public Health Act, 1875.

Sect. 124 Public Health Act, 1875.

Rent and cost of administration.

Influence of hospital on surrounding neighbourhood.



bleacher, and Mr. Adams is assured that he only handled them after they had been well boiled in strong alkali under pressure. So also no other case of small-pox had occurred amongst the employés at the mill since March 1877, and none followed except the case next to be adverted to.

The other house attacked was No. 17, Tufton Street, and here a woman named Filmer and her adult son and daughter sickened. The mother is the only member of the family who worked at the paper mill, where she is stated to have been engaged in cutting "new calico remnants." She was attacked on 21st July 1878, no other case having occurred amongst the mill employés since Cook's attack in April. Mrs. Filmer's daughter, who is engaged at a school, was attacked on July 22nd, and her son, a cow-herd in the country, on July 23rd. The attacks were thus all but simultaneous; identity of cause seem hence indicated; and locality of residence appears to be all which, for the purposes under consideration, the patients had in common. The house occupied by the Filmers lies 5 doors west of, and nearly 50 feet from, the nearest of the hospital cottages, which include from No. 22 to No. 25. But between Nos. 20 and 21 is a passage leading from Tufton Street to the back of the houses, and this passage formed the usual means by which the Filmers left and returned to their home. One end of this passage is within 11 feet 6 inches of the hospital garden, and the passage being also available for No. 21, which adjoins the hospital premises, persons using it can, if they choose, reach the immediate vicinity of the garden from which they are only separated by a wall 5 feet 3 inches in height.

It is known that after the discharge of two small-pox patients on July 27th, certain "cleaning processes" were going on at the hospital, and as this was a general custom with discharge of such patients, it is thought highly probable that similar measures were adopted after the discharge of a previous case of small-pox on July 8th: and in connexion with this belief, the assertion of Mrs. Filmer, that some days previous to her attack, she observed mattresses and bedding lying exposed in the garden behind the hospital cottages, becomes significant.

Mr. Adams was not in office as Medical Officer of Health at the time of these occurrences, and there are no means of procuring a trustworthy estimate as to the number of small-pox cases in Maidstone at the date in question. But in connexion with the causation of the attacks referred to, it should be stated that three cases of small-pox were under treatment in the hospital at the date when the Filmers probably contracted their disease; that small-pox was prevalent in various parts of the borough between March and August 1878, and hence that other sources of infection were in operation. And further, if the hospital was the source of infection in the cases of Cook and the Filmers, it should be remembered that the conditions favourable to the spread of such infection which obtained on these imperfect and temporary hospital premises were such as could never arise in a properly constructed and properly administered hospital for infectious diseases.

The unsuitability both of the site and the premises for the purposes to which they have been put is, indeed, recognised by the Sanitary Authority, who are engaged in seeking a more appropriate locality for a future hospital.

Ten other houses are situated within 50 feet of the hospital. Of these one is empty, and all trace of the family formerly occupying it is lost. The remainder contained 42 residents at the date of the outbreak of small-pox in 1878, and none of these were attacked with small-pox. Ten of them, including one entire family of four who had never been vaccinated, had already suffered from small-pox; 29 had been vaccinated, three of them a second time, and the marks of the vaccination are in 27



of them described either as specially good, good, or fair; those in the remaining two being only faint. In two no evidence of vaccination was found, but one is believed to have had small-pox in infancy. The remaining resident has died since 1878, and nothing is known as to his having had any protection against the disease.

Cook had been vaccinated in infancy, but not revaccinated after puberty; his attack was a very mild one. The Filmers had all been very imperfectly vaccinated in infancy, one single small mark remaining in each case; they had not been revaccinated, and their attacks were somewhat severe.

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

## MANCHESTER URBAN SANITARY DISTRICT.

Estimated Population in 1881, 341,269.

On the appointment, some 10 years ago, of Mr. Leigh, the present medical officer of health for the city of Manchester, there was practically no public provision for the isolation of cases of infectious diseases. Up to a few years previous to this, there had been in connexion with the Manchester Royal Infirmary a House of Recovery, containing 80 beds for the reception of all such cases except small-pox, but the building being in a central part of the city, the board of management of the Infirmary procured an Act of Parliament sanctioning its demolition, on condition that the same number of beds were reserved for similar diseases in the Royal Infirmary. The upper floor of one wing of the Infirmary was, under these circumstances, set apart for infectious cases, but as it was but little used for such purposes the beds came to be occupied by ordinary cases of disease. This wing communicated with other parts of the building by means of a common staircase. Mr. Leigh, however, being anxious to isolate as many cases of infectious disease as possible, communicated to the board of management, soon after his appointment, his intention to send in patients. Later on several proposals were made as to the desirability of providing a distinct building for this purpose. One of these emanated from the board of management itself, mainly on the ground that the infection of scarlet fever had spread from the "fever wards" to other parts of the Infirmary, attacking both patients and hospital officials.

In 1871 the late Mr. Robert Barnes, formerly mayor of Manchester, contributed a sum of 9,000*l.* towards the erection of a hospital for infectious diseases, and a property known as the Monsall Estate, situated about 2½ miles from the centre of the city, was then purchased for the purpose. Buildings were shortly after erected on the estate, and the hospital is now styled the Monsall Hospital.

In addition, however, to this hospital, there is a second one available for the reception of cases of infectious diseases from Manchester, namely, the Pendlebury Hospital for Sick Children.

I. *The Monsall Hospital* is situated on an elevated plateau in the north-western portion of the urban sanitary district of Newton Heath, a district which adjoins the north-eastern boundary of the city of Manchester. The soil is clay. The hospital occupies a large open space as yet unbuilt on, the nearest houses being some 850 feet to 1,000 feet distant. At present the site consists of 11 acres; part of this, however, includes a small wooded ravine, and some 9½ acres only are available for the purposes of hospital construction. These 11 acres are the property of the Trustees of the Manchester Royal Infirmary, who have recently made arrangements to take on lease, for a period of 999 years, a further area somewhat over 4 acres in extent; this course being adopted

Monsall  
Hospital.

Site and soil.



both with the view of insuring an open space between any hospital buildings and certain streets which are in contemplation, and also to afford room for any additional buildings which may become necessary on account of an arrangement now being entered into with the Corporation of Salford for the isolation of such cases of infectious disease as may be in excess of the provision available in that borough. The more accessible portions of the present site are enclosed by a stone wall varying from 6 feet to 8 feet in height.

The existing buildings are: 1st, Monsall House, the original residence on the estate. This is used as a residence for the resident medical officer, the assistant resident medical officer, and the matron; it also serves for the purposes of general administration, and contains a surgery. 2nd. A detached block containing kitchens, day rooms for nurses and servants, and sleeping rooms for nurses. 3rd. A separate cottage containing sleeping rooms for servants. 4th. The main hospital building, a two-storied brick structure. 5th. Three large wooden pavilions, erected during the small-pox epidemic of 1876-1877. 6th. A so-called "Cottage Hospital," built of brick. 7th. A brick pavilion, originally constructed for small-pox, but occasionally used, as at the date of my visit, for cases of erysipelas sent from the Royal Infirmary. 8th. Two cottages for men employed on the premises. 9th. Entrance lodge, store-house, steam laundry, dead-house, disinfecting-chamber, ambulance shed, stabling, &c.

1°. The main hospital building is a substantial two-storied brick structure which was erected in 1872. Roughly speaking it is T shaped. The horizontal or front portion of the T has a south-western aspect and contains the principal wards lying on either side of a lobby, which is situated in the centre and is continuous with a central passage down the perpendicular portion. The two floors communicate by means of a staircase and an open "well." The wards consist of four groups, two on either floor, and each consisting of three separate rooms opening into each other.

These wards are provided with means of cross-ventilation by windows placed in opposite external walls. The windows themselves only open at the top by means of a pivot-hung sash; there are, however, ventilating openings above each window and on the floor level. The waterclosets, sinks, and bath-rooms are in a projecting block, but they are only imperfectly separated from the wards. On the ground floor the wards in this portion of the building were in use for typhus patients at the date of my visit. Those on the upper floor have additional means of ventilation through the roof, and were unoccupied.

In the rear portion of the building the several rooms lie on either side of the central passage; they consist of two small wards on either floor, rooms necessary for administrative purposes, ward-sinks, water-closets, &c. I found the wards on the ground floor in use for scarlet-fever patients; those on the upper floor were not occupied. None of them are provided with proper means of cross-ventilation. The closets and sinks open directly into the central passage.

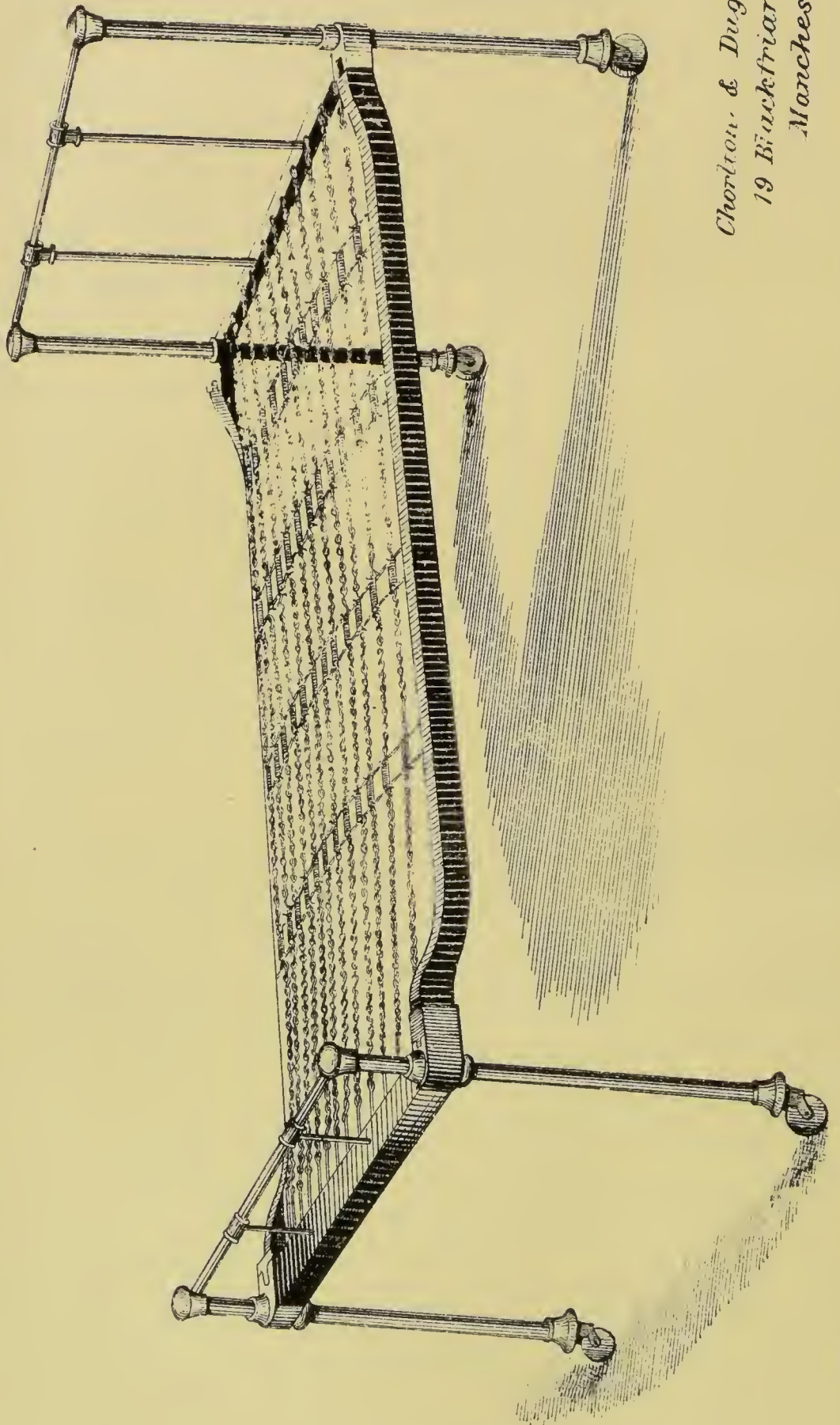
This block is provided with 70 beds, the floor space per bed varying from 65 to 120 square feet, and the cubic space from 910 to 1,620 cubic feet. All the wards are 14 feet in height, and those containing the least area per bed are reserved for children. All the wards are heated by means of open fireplaces.

2°. The three wooden pavilions will not need a detailed description. The foundations and some other parts consist of brickwork. One is known as the Township's Hut, it having been hurriedly erected in a fortnight, at the cost, and for the purposes, of several sanitary districts





IRON BED  
WITH "EXCELSIOR" SPRING MATTRESS.



*Chorlton & Dugdale.  
19 Blackfriars Street  
Manchester.*



around Manchester, for the reception of small-pox patients in 1876 and 1877. Another is called the Corporation Hut, and it, too, was erected under similar circumstances by the Manchester Corporation. The third is styled the Infirmary Hut, it having been removed from the Manchester Royal Infirmary in 1871. All these huts are so constructed as to admit of the reception of cases of one disease in both sexes. The two former exhibit indications of their hurried erection, and would need repair before occupation. The Infirmary Hut, which is lighted by a skylight, has large hinged wooden shutters instead of windows, and cannot be deemed fit for the reception of the sick. The closet accommodation for the latter hut consists of common privies-with-pit. The three huts together were intended for the reception of 114 patients.

3°. The Cottage Hospital is a substantial two-storied brick building, containing six small wards, two small bedrooms, together with administrative apartments, bath-room, closets, &c., and it is as a rule set apart for better-class patients; it is neatly constructed, and the walls are throughout coloured with silica-distemper, which admits of being washed with water. There are open fireplaces to all the rooms. Each of the six wards contains two beds, the floor space per bed being 94 square feet, and the cubic space 1,030 cubic feet. The height of the wards is 11 feet. The waterclosets are separated from the wards by means of a lobby containing a sink and having a window on one side only. Subject to the small floor and cubic space allowed per bed, this building is deemed to afford accommodation for 13 patients.

4°. The pavilion now in use for erysipelas cases is a one-storied building, also constructed of brick. It consists of two wards, one on either side of a central administrative block which projects to the front and rear beyond the ward walls. At the end of each of the ward wings a separate room opening into the general ward has been built for the use of one private patient. The wards are provided with windows on both sides, the windows being constructed like those in the principal hospital building. Above the windows are openings admitting fresh air, which is directed towards the ceiling; and in the centre of each ward is a ventilating shaft through the roof. Open fireplaces are provided throughout. The height of the wards is 15 feet. There are 20 beds in the pavilion, the floor space per bed being 104 square feet, the cubic space 1,560 cubic feet.

All the more recent beds in use at Monsall Hospital are manufactured by Messrs. Chorlton and Dugdale, of Blackfriars Street, Manchester. They consist of a combined iron bedstead and spring wire mattress in one, over which a thin horse-hair bed is placed. The wire mattress is made with a slight curve upwards towards the centre, so that the patient never lies in a hollow. These bedsteads with mattresses are highly spoken of by the resident medical officer as being specially adapted to the use of hospitals for infectious diseases; they are not only comfortable but they can always be kept thoroughly clean. The hair beds are periodically submitted to disinfection by dry heat. (See Plate No. XX1.)

Beds.

The disinfecting chamber is fitted with Messrs. Perkins & Sons heating apparatus, the heat being conveyed to a small vaulted brick chamber by means of hot-water pipes arranged along the walls and floor. The door of the chamber is well padded and lined with iron. The ordinary temperature reached is 230° Fahr., this being maintained for half an hour when articles are being disinfected. A higher temperature can, however, be secured. Whenever bedding, &c. are placed in the chamber they are taken to pieces and spread out on open iron rails, and on only one occasion has any experiment been made to ascertain how high a temperature can be reached in the interior of any such article.

Hospital  
disinfecting  
apparatus.

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On the Use and  
Influence of  
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Infectious  
Diseases, by  
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Ambulances.

On that occasion a registering thermometer placed inside a flock-pillow exhibited after an hour's exposure a temperature of 220° Fahr., that of the chamber itself being 250° Fahr. No article is known to have been scorched or otherwise damaged, but the apparatus is apt to give trouble on account of the escape of water at leaky joints.

The ambulance is fitted with a movable stretcher, which, when fixed inside, can be so arranged as to allow the patient to occupy a sitting or a recumbent position. A second ambulance, capable of receiving two movable stretchers, is kept in one of the Corporation yards in the City. Whenever it is used it is placed in charge of one of the inspectors of nuisances in addition to the driver, the former being subject to stringent rules, which, amongst other things, prohibit any halt on the journey to or fro. After each use the ambulances are cleansed and subjected to fumigation with chlorine fumes. Private patients can be removed to Monsall Hospital free of charge from any part of Manchester.

Drainage,  
water supply,  
&c.

Monsall Hospital is at present drained into the Moston Brook, which ultimately reaches the Irwell. Between the buildings and the outfall is a "disinfecting chamber" in which a certain volume of chlorine gas is brought into contact with the flowing sewage. All the drain inlets are outside the buildings. The surface water passes direct into a pond in the plantation. The water supply is derived from the Manchester Corporation Waterworks.

Admissions  
through the  
Manchester  
Corporation.

The NUMBER of CASES sent to MONSALL HOSPITAL by the MANCHESTER CORPORATION during the FIVE YEARS 1876-80 has been as follows:—

Date.	Small-pox.	Scarlet Fever.	Typhus Fever.	Enteric Fever.	Febricula.	Measles.	Erysipelas.	Other Diseases.	Totals.
1876 ... ..	739	13	8	11	6	0	2	52	831
1877 ... ..	396	15	7	21	4	0	3	20	466
1878 ... ..	6	12	12	25	5	0	1	5	66
1879 ... ..	6	22	6	12	1	1	0	8	56
1880 ... ..	2	42	0	19	3	5	0	18	89
Five years 1876-80 ... ..	1,149	104	33	88	19	6	6	103	1,508

Admission of  
paupers.

These, however, do not represent the total admissions from the borough of Manchester. On an average some 20 private patients from various sources are admitted annually, and not only so, but since September 1877 the Guardians of the Manchester Union have sent in paupers' cases. During the two years 1878-79 the number of paupers admitted from Manchester has been as under:—

—	Small-pox.	Scarlet Fever.	Typhus Fever.	Enteric Fever.	Febricula.	Measles.	Erysipelas.	Other Diseases.	Totals.
1878 ... ..	3	39	9	10	4	0	0	20	85
1879 ... ..	0	27	5	6	4	4	0	16	62
1880 ... ..	0	50	10	7	6	0	0	15	88
Two years 1878-79 ... ..	3	116	24	23	14	4	0	51	235

Until about two years ago the paupers were at times sent to the hospital in pauper dress, but as this led to other patients making complaint that they were compelled to mix with them, the Monsall Hospital Committee, who manage the hospital on behalf of the Infirmary Board,



passed a resolution refusing for the future to admit paupers in any distinctive dress. Since this has been enforced all complaints are stated to have ceased.

The social status of the patients admitted may be judged of by the following analysis of the calling of 295 patients admitted in the year ending June 1880:—

Domestic servants	-	-	-	-	-	32
Tradesmen and their assistants	-	-	-	-	-	17
Clerks	-	-	-	-	-	12
Cabmen, policemen, &c.	-	-	-	-	-	11
Nurses from different institutions	-	-	-	-	-	6
Hotel keepers	-	-	-	-	-	3
Governesses	-	-	-	-	-	2
Student	-	-	-	-	-	1
Mill-hands, operatives, paupers, &c.	-	-	-	-	-	211
						<hr/> 295 <hr/>

APP. NO. I.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Social status of  
patients.

Many of the above were, however, children, the trade or following of their parents being indicated. Indeed I am informed that the difficulties attendant upon the admission of children are steadily although slowly disappearing. When objection is raised on the ground of their youth the mothers are told that they can come in also, and Dr. Henry Tomkins, the Resident Medical Officer, states that in many such cases the mothers depart without even entering the wards, and that in others they leave in a few days, their clothing, in the latter case, being first disinfected. If the mothers stay in any length of time they are charged for as patients. Having regard, however, to the amount of infectious sickness amongst adults and children respectively, it is felt by Mr. Leigh that there is much less isolation carried out amongst the latter than amongst the former, and he feels that the isolation of children will, in a city like Manchester, never be thoroughly effectual until small local hospitals for infectious diseases are established in different parts of the district. Indeed, speaking generally, he finds, especially as regards children, that the difficulty in securing their removal to hospital increases as their homes become more distant from the hospital.

Admission of  
young  
children.

Examination of the hospital register shows that out of 500 patients admitted the ages were as follows:—

Age.										Number admitted.
Under 1 year	...	...	...	...	...	...	...	...	...	3
1 year	...	...	...	...	...	...	...	...	...	10
2 years	...	...	...	...	...	...	...	...	...	16
3 "	...	...	...	...	...	...	...	...	...	22
4 "	...	...	...	...	...	...	...	...	...	25
5 "	...	...	...	...	...	...	...	...	...	26
6 "	...	...	...	...	...	...	...	...	...	18
7 "	...	...	...	...	...	...	...	...	...	20
8 "	...	...	...	...	...	...	...	...	...	8
9 "	...	...	...	...	...	...	...	...	...	13
10 "	...	...	...	...	...	...	...	...	...	5
										<hr/> 166
Over 10 years	...	...	...	...	...	...	...	...	...	334
										<hr/> 500
Total	...	...	...	...	...	...	...	...	...	

## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Admission of  
visitors.

Of these 500 some 420 suffered from scarlet fever, the remainder from measles and febricula. Although this list includes patients admitted from all sources, yet by far the majority of the children came from Manchester itself. It must also be remembered that children are sent by the Manchester Corporation to Pendlebury Hospital.

The comparative success which has been obtained in the matter of the isolation of children is the more striking because of the stringency of the rules relating to the admission of visitors. Under ordinary circumstances no visitors are allowed to enter the establishment. This rule is, however, relaxed at the discretion of the Resident Medical Officer in the case of patients in the erysipelas wards. But as regards the other wards, visitors have only in one or two very special cases been admitted even when fatal results were anticipated. There is, however, telephonic communication between the hospital and the Royal Infirmary in Manchester, where inquiry may at any time be made as to the welfare of patients. Whilst at the hospital I could not fail to note that the answers sent to inquirers, instead of being merely formal or limited to monosyllables, afforded some detailed information as to the progress of the patients in question, and to this is probably due the fact that the arrangement has to a very great extent done away with the difficulties which might otherwise have attended the rule which prohibits visiting.

Cost of main-  
tenance, &c.

The Manchester Corporation consider that they have a right to secure the isolation of a certain number of "fever" cases at Monsall Hospital free of charge; but they pay an annual sum of 200*l.* to the Royal Infirmary on behalf of the cases of various infectious diseases they send in, and calculating the cost per patient at 14*s.* per week when the number of patients under treatment is less than 80, and 21*s.* per week when that number is exceeded, they pay an additional sum at that rate when the 200*l.* has been reached.

Recovery of  
payment from  
patients.

In no instance has the Corporation made any charge to patients they have sent in to the hospital; it being felt that since the permanent charge of 200*l.* a year, and also any additional sums beyond that amount are paid out of the rates, all residents are entitled to admission to the ordinary wards free of cost. In certain instances it has been reported to the Medical Officer of Health that persons sickening in some adjoining districts have been brought into the city in order to secure removal to the hospital, free of charge, and since infectious disease upon the border of the district is looked upon by the Medical Officer of Health as constituting a danger to the city almost, if not quite, as great as any such case within its area, these patients have always been dealt with in the same way as if their illness had arisen within the district. All persons requiring special accommodation at the hospital make their own terms with the secretary of the Royal Infirmary, or with the resident medical officer, those terms generally varying, according to circumstances, from 1*l.* 1*s.* to 3*l.* 3*s.* a week. The Guardians of the Manchester Union pay 25*s.* a week per patient.

Private  
patients.

Administrative  
staff.

The permanent resident hospital staff includes, under ordinary circumstances, a Resident Medical Officer, who has administrative and medical charge of the hospital, and is responsible to the Monsall Hospital Committee; an Assistant Medical Officer, generally a qualified infirmary student; a matron; two head, and six ordinary nurses; three male and ten female servants. There are also two non-resident officials, namely, the engineer and the gardener.

Sanitary and  
Poor-law  
Authorities  
using Monsall  
Hospital.

Other Authorities, however, besides the Manchester Corporation have made arrangements for the admission of cases of infectious diseases into Monsall Hospital. Thus the Crumpsall, Gorton, Levenshulme, Moss Side, Newton Heath, Prestwich, Stretford, and Withington Urban



Authorities, combined in the erection of the "Townships Hut," and they are entitled to send 30 patients a year to the hospital, on payment of 14s. a week for each patient. These Authorities also make an annual contribution to the Fever Hospital, varying from 5*l.* 5*s.* to 21*l.* The Urban Sanitary Authority of Salford pay 200*l.* a year; the Bradford (Lancas.), Failsworth, Sale, Swinton and Pendlebury, and Rusholme Urban Authorities 10*l.* 10*s.* a year, and the Heaton Norris Urban Authority 8*l.* 8*s.* a year to the hospital, and they have a right to send in as many patients as can be accommodated, at the rate of 25*s.* a week. The Prestwich Poor Law Guardians have a somewhat similar arrangement, a reduction in the weekly payment being however made in their favour because the Prestwich Rural Sanitary Authority, since merged into an urban district, contributed towards the erection of the Townships Hut. The Guardians of the Chorlton Union also send in cases on payment of 25*s.* per week per patient.

Excluding the borough of Salford, the arrangement with regard to which has only recently been completed, and will involve the erection of additional buildings at the hospital, the total population of the sanitary districts for which Monsall Hospital now professedly provides means of isolation, is as follows:—

Urban Districts.					Population in 1871.
Crumpsall	...	...	...	...	5,342
Failsworth	...	...	...	...	5,685
Gorton	...	...	...	...	21,618
Heaton Norris	...	...	...	...	3,294
Levenshulme	...	...	...	...	2,742
Manchester	...	...	...	...	351,189
Moss Side	...	...	...	...	5,311
Newton Heath	...	...	...	...	18,079
Prestwich	...	...	...	...	5,691
Rusholme	...	...	...	...	7,430
Sale	...	...	...	...	5,573
Stretford	...	...	...	...	14,453
Swinton and Pendlebury	...	...	...	...	14,052
Withington	...	...	...	...	10,315
					470,774

Manchester, it is true, also uses the Pendlebury Hospital for Children, but on the other hand the Chorlton Guardians use Monsall Hospital for paupers, some of whom are not resident in any of the above-named sanitary districts. Having regard to these circumstances, and making allowance for the increase of population since 1871, it appears that the present population for which Monsall Hospital is deemed to afford means of isolation amounts to considerably over half a million. If all the buildings were fit for the reception of patients, the total number of beds available would be 217.

The Authorities of several of the sanitary districts outside Manchester, however, make but little or no use of the hospital. The following table shows the number of patients sent in during 1879, from those districts concerning which arrangements had been made with the authorities of Monsall Hospital during or prior to 1878, and also the total deaths registered in the several districts from the corresponding diseases, together with the distance of the hospital from the most populous parts of the several districts.

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On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Urban Sanitary Districts.	Popu- lation in 1871.	Popu- lation Estimated in 1879.	Deaths Registered.	Admissions to Monsall Hospital	Approximate Distance of District from the Hospital.
			From under-mentioned Diseases in 1879.		
Failsworth ...	5,685	8,000	{ Scarlet fever ... 38 Diphtheria ... 1 "Fever" ... 1	0 0 0	{ Under 1 mile.
Gorton ...	21,618	30,000	{ Scarlet fever ... 22 Diphtheria ... 2 "Fever" ... 14	0 0 3	
Moss Side...	5,311	?	{ Scarlet fever ... 5 Diphtheria ... 4 "Fever" ... 7	1 0 0	
Newton Heath ...	18,079	27,000	{ Scarlet fever ... 41* Diphtheria ... 3 "Fever" ... 2	2 0 0	
Prestwich ...	5,691	6,000	{ Scarlet fever ... 0 Diphtheria ... 0 "Fever" ... 0	0 0 0	{ 3 to 4 miles.
Stretford ...	14,453	20,000	{ Scarlet fever ... 4 Diphtheria ... 1 "Fever" ... 3	5 0 2	
Withington ...	10,315	16,700	{ Scarlet fever ... 4 Diphtheria ... 0 "Fever" ... 1	4 0 0	

\* These deaths do not include any occurring in Monsall Hospital.

In some instances the distance of the hospital from the population needing isolation, and in others the knowledge that a demand will be made by the Sanitary Authorities for repayment of the expenses incurred are known to have hindered the use of the hospital, but these causes do not alone suffice to explain why no measures of isolation in hospital are resorted to, and it seems obvious that as regards some districts the arrangement made is but a formal one.

Including all the various sources from which patients have been admitted into the hospital, the following Table shows the total amount of isolation which it has afforded during the five years 1876-80.

#### TOTAL ADMISSIONS to MONSALL HOSPITAL during the five Years 1876-80.

Date.	Small- pox.	Scarlet Fever.	Typhus.	Enteric Fever	Febric- ula.	Measles.	Erysi- pelas.	Other Diseases.	Totals.
1876 ... ..	899	40	18	47	7	0	118	82	1,211
1877 ... ..	488	57	26	37	7	3	80	49	747
1878 ... ..	24	84	21	53	10	1	61	50	304
1879 ... ..	8	85	18	36	6	9	74	41	277
1880 ... ..	7	161	62	47	9	16	49	62	413
Five years 1876-80 ...	1,426	427	145	220	39	29	382	284	2,952

Total admis-  
sions to  
Monsall  
Hospital.



The district from which the largest sums have been refunded on behalf of patients is the Newton Heath Urban District, and I am there informed that great difficulty is experienced in securing such re-payment, some persons even permanently leaving the district soon after the demand is made upon them rather than pay. In the three years ending March 1879, a period which included the small-pox epidemic of 1876-77, the Urban Sanitary Authority for this district paid 316*l.* 7*s.* for the isolation and treatment of patients in Monsall Hospital, of which 61*l.* 5*s.* 6*d.* was re-paid to them.

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Recovery of payment from patients in Newton Heath.

Influence of the hospital on the surrounding district.

It has already been stated that Monsall Hospital lies within the urban district of Newton Heath. When the hospital came into extensive use during the small-pox epidemic in 1876-77, a committee, representing the ratepayers, made formal objection to the use to which the hospital was put. They explained that in one year some 800 small-pox patients had been admitted into it, and that both the hospital and the ambulances constituted a source of danger to the district. As the result of my own inquiries, I ascertained that Newton Heath has an estimated population of 27,000, and also that the ambulances on their passage to Monsall Hospital, both from Manchester and most of the other sanitary districts from which, during the small-pox epidemic, patients were sent in, traversed the most populous part of Newton Heath for a distance of about three-quarters of a mile. Having regard to these facts I sought information as to whether any spread of infection had taken place, either from the hospital direct or by means of the ambulances. The Sanitary Authority and their officers not only knew of no such spread, but they assured me that the proportion of attacks from small-pox to population in this district during the epidemic was less along the route of the ambulances than in other localities, and they expressed their belief that the existence of the hospital within their district constituted one of their principal safeguards against epidemic disease. The principal member of the committee above referred to was also visited. He informed me that personally he had modified his opinion with regard to the hospital, and that in view of past experience he did not believe it operated prejudicially on the district. Later on, and after he had, at my request, sought the opinion of other members of the committee, he further stated in writing that with regard to the allegation "that the proximity of the hospital to dwellings had led to the spread of infectious disease," it was "generally admitted that such is not the case;" and as to the ambulances having been a means of conveying infection, he stated that no information on that point was forthcoming, although he expressed the opinion that the person in charge of them should be subject to "stricter supervision."

The cost of maintaining Monsall Hospital during the two years ending June 30, 1879, has been as follows:—

Cost of maintenance, &c.

Expenditure.	1877-78.	1878-79.
	£ s. d.	£ s. d.
By Dispensary sundries ... ..	141 2 10	81 8 8
" House expenses ... ..	1,491 1 11	1,081 15 10
" Officers' salaries ... ..	147 5 4	267 10 0
" Servants' wages and gratuities ... ..	532 11 10	563 8 7
" Stationery, printing, and advertising ... ..	13 8 11	19 18 9
" Linen, woollen, and smallwares ... ..	30 9 0	29 13 5
" Bedding, &c. ... ..	214 1 4	39 16 2
Carried forward ... .. £	2,570 1 2	2,083 11 5

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Expenditure.						1877-78.	1878-79.
						£ s. d.	£ s. d.
Brought forward							
By	Fixtures and furniture	...	...	...	...	2,570 1 2	2,083 11 5
„	Domestic implements and utensils	...	...	...	...	70 2 5	235 11 6
„	Alterations and repairs	...	...	...	...	36 5 9	52 8 10
„	Painting and whitewashing	...	...	...	...	269 6 10	291 8 11
„	Insurance from fire	...	...	...	...	108 6 0	30 12 8
„	Carriage of goods and postages	...	...	...	...	9 4 9	8 17 3
„	Sundries	...	...	...	...	33 11 1	20 19 9
„	Garden seeds and plants	...	...	...	...	7 2 1	18 9 7
„	Commission on new subscriptions, &c.	...	...	...	...	—	2 4 0
„	Water rate	...	...	...	...	—	3 12 3
„	Poor rate and taxes	...	...	...	...	26 10 3	17 19 3
„	Nurses' uniform	...	...	...	...	5 10 3	108 12 7
„	Porters' ditto	...	...	...	...	26 0 7	16 13 2
„	Provender	...	...	...	...	3 6 2	4 4 6
„	Rent of telegraph wire	...	...	...	...	—	118 3 11
„	Interest paid to bankers	...	...	...	...	27 10 0	27 10 0
„	Law charges	...	...	...	...	—	23 6 11
„	Books, &c., for library	...	...	...	...	—	—
„	Sadlers' account, &c.	...	...	...	...	—	2 3 6
						—	15 19 3
						£	
						3,192 17 4	3,082 9 3

Hospital for  
Sick Children  
Pendlebury.

II. *The Children's Hospital at Pendlebury* is situated within the urban sanitary district of Swinton-and-Pendlebury. It is connected with a dispensary for sick children in Manchester, and lies nearly four miles from the centre of that city. The hospital is a general one for the treatment of nearly all diseases occurring in children under 15 years of age, and it has a separate pavilion for the treatment of cases of infectious diseases occurring in Manchester. Small-pox and whooping-cough are rigidly excluded; enteric fever is treated in the ordinary wards and scarlet fever, measles, and occasional cases of typhus are received into the infectious pavilion, which is known as the "Borchardt" ward.

Hospital  
buildings.

The hospital buildings afford an admirable example of modern hospital construction. They occupy some five acres of land, and consist of an administrative block, separate ward pavilions, together with certain out-buildings, the whole beng substantially and elegantly constructed of brick and stone. The administrative block is a large building, consisting of a basement and two stories above. A considerable portion of it consists of residential apartments for the staff, and on the upper floor are certain bedrooms for the nurses occupied in the "Borchardt" or "fever" ward. Behind the centre of the administrative block, and running at right angles to it, is a corridor 12 feet in width, about 330 feet in length, and well provided with means of lighting and ventilation by windows in opposite walls and three lantern lights. Where each of the latter is situated, two short corridors, also 12 feet wide, and well provided with means of cross-ventilation, open out at right angles, and lead to two ward-pavilions, one on either side of the main corridor. These pavilions are thus six in number, the spaces between the adjacent pavilions being 160 feet. There are also in the course of this corridor several other apartments opening out from it; such as a separate reception room for fever patients near the Fever Ward, a general dining-room for nurses, and a separate dining-room for nurses occupied in the fever ward.

Construction  
of the "Fever"  
Ward.

The Fever Ward in all essential respects resembles the other five wards. It is a single-storied building, having its outer walls, constructed as



cavity walls, 18 inches in thickness. It is 99 feet long, 26 feet broad, and 17 feet high. The ceiling is flat, and projections which would admit of the deposit of dust have throughout been carefully avoided. The walls are coated with parian cement. The floors are of oak, well laid without intervening crevices, and they are dry-rubbed. There are 13 windows in each of the opposite side walls. At one end of the ward a door opens into the corridor, and at the other are two windows, and a large folding-door fitted with glass panes; the latter opening on to a verandah. The windows all consist of two sliding sashes and of a hinged sash above, which opens inwards. They commence at a height of about 3 ft. 6 in. above the floor and rise to within 18 inches of the ceiling. On each side of the ward are 12 Sheringham ventilators, situated 1 foot below the ceiling, and air bricks open above the floor level under each bed. Two chimney stacks with air-shafts occupy central positions in the ward; they are about 30 feet apart and about 25 feet from each end of the ward. In each of these are two open fireplaces; a special apparatus for supplying air to the wards by mechanical means; and two ventilating openings, 18 inches by 12 inches, situated near the ceiling. There are 26 beds in the ward, 13 on either side. After making allowance for the shafts, &c., each child has some 98 feet of floor-space, and some 1,650 cubic feet.

The ventilation of the wards is to a considerable extent carried on by means of a fan. The air is taken from a small raised shaft, so situated in connexion with a separate building that it cannot take in any ward emanations. It is then driven into the wards through the shafts occupying their centre, there being for this purpose two outlets at a height of 6 feet above the floor, in each shaft. During nine months of the year the air, before being driven into the wards, is heated by being passed over steam pipes.

Opening out from the wards are, on one side a lavatory and bath room, and on the other waterclosets and ward sinks. These offices are themselves efficiently ventilated, and are separated from the ward itself by a lobby provided with means of cross-ventilation.

The water-supply is derived from the Manchester Corporation Water-works. The drainage is into the local sewers, there being no direct communication between the interior of the building and the drains. The latter are trapped before joining the main sewer, and efficiently ventilated.

During the four years ending December 1880, the total number of cases of infectious diseases admitted to this hospital has been as under; all the cases coming from Manchester, excepting only a few received from the urban district of Salford in 1877.

Ward offices

Water-supply  
and drainage.Admission of  
patients.

Date.	Scarlet Fever.	"Fever."	Measles.
1877 ...	108	12	63
1878 ...	112	29	63
1879 ...	98	28	10
1880 ...	99	24	8
1877-80 ...	417	93	144

Most of the patients are sent to the hospital through the agency of the dispensary in Manchester in an ambulance belonging to the institu-

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Visitors

tion ; others, however, are sent in direct by the Manchester Corporation, who contribute 200*l.* a year to the funds of the hospital.

One relation or friend is allowed to visit each patient, both in the Fever Ward and in the general wards, twice a week. Many, however, do not under ordinary circumstances avail themselves of this privilege as regards fever patients, both because it is generally known that on the occurrence of serious symptoms they will be communicated with, and because there is telegraphic communication between the hospital and the dispensary in Manchester where news as to any patient's welfare can be obtained.

Special information was procured at the Pendlebury Hospital on two points of interest. The first relates to the means of warming and ventilation ; the second to the use of a general hospital for the reception of cases of infectious disease.

Special experi-  
ments as to  
warming and  
ventilation.

1°. *Warming and Ventilation.*—In the months of January and February 1880 some very exhaustive experiments were carried out by Dr. Angus Smith, F.R.S., with a view of ascertaining how far the arrangements for warming and ventilating the wards at the hospital were efficient ; the immediate ground of the experiments being, that when, during the winter months, a sufficient number of the hinged upper frames of the windows were kept open to secure what was deemed to constitute efficient ventilation, difficulty was experienced in maintaining the wards at a sufficiently high temperature. The ward selected for the experiments was not the Fever Ward, but it resembled the latter in every respect, save that being situated somewhat further from the fan, the warmed air it received was not of quite so high a temperature as that reaching the Fever Ward. It has the same dimensions, the same number of windows, and the same means of warming and ventilation ; and during the course of the experiments the four open fireplaces were all in use.

The ward was at the time occupied by 30 patients and nurses, and the fan was ascertained to drive into it 32,184 cubic feet of air at a temperature varying from 122° to 158° Fahr. per hour. The ward, having a capacity of 43,000 cubic feet, thus had supplied to it a change of air every 80 minutes, even when the doors were kept shut. The latter, however, being in ordinary use admitted some 11,000 additional cubic feet of air.

The following is a brief summary of a considerable number of experiments which were made at different points down the two sides and the centre of the ward, and at a height varying from 3 feet to 6 feet above the floor. When three window-frames on each side of the ward were open, having incoming draughts on the right-hand side, and outgoing ones on the left-hand, and with a temperature of 32·2° Fahr. outside the hospital, and of 43·6° Fahr. in the ward corridor, the amount of carbonic acid found in the air in parts per million, and the registered temperature were as follows :—

—					Carbolic Acid in Parts per Million.	Temperature in Degrees Fahr.
Left side	...	...	...	...	From 519 to 661	From 50·6° to 50·1°.
Centre	...	...	...	...	From 577 to 710	From 55·6° to 58·2°.
Right side	...	...	...	...	From 512 to 561	From 48·1° to 48·7°.

With an average temperature outside the hospital of 48·2° Fahr., and in the ward corridor of 50·0° Fahr., and when all the ward windows had



been closed for 18 hours, the door alone opening and shutting at frequent intervals, the results were :—

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—					Carbolic Acid in Part per Million.	Temperature in Degrees Fahr.
Left side	...	...	...	...	From 625 to 700	From 62·6° to 66·2°.
Centre	...	...	...	...	From 521 to 684	From 62·6° to 68·0°.
Right side	...	...	...	...	From 609 to 736	From 64·4° to 68°.

Thus, when the six windows were open, the sides of the wards where the beds were situated were favourably placed, so far as the amount of carbonic acid in the air is concerned ; but they were somewhat unfavourably placed in point of temperature. When by the closing of the windows and owing to the existence of a warmer air outside, the temperature at the sides of the wards was raised to 60° Fahr., the amount of carbonic acid in those parts of the wards which are furthest from the central shafts at which the air enters from the fans, became excessive ; indeed, the nurses had complained of the quality of the air as becoming stuffy and unpleasant whenever the amount of carbonic acid was at 644, provided the temperature of the ward approached 60° Fahr., a result which in the opinion of Dr. Angus Smith was due to the circumstance, that with a high temperature the increased evaporation leads to an increase in the odour of the exhalations emitted from the bodies of the patients. The final conclusion he arrived at was, that unless supplemented by window ventilation, the fan did not keep the air of the wards at a sufficient standard of purity.

In connexion with the difficulty of obtaining a sufficiently high ward temperature during the colder months, so long as a reasonable number of windows are used for the purpose of ventilation, it should be noted that the total amount of window surface in each ward is 1,213 square feet, or at the rate of one square foot to every 35 cubic feet. This obviously presents an exceptionally large cooling surface.

2°. Pendlebury Hospital, being constructed on the most modern principles, and being subject to a stringent administration, it became interesting to ascertain whether the use of one of the ward pavilions for cases of infectious diseases had led to the spread of infection to others. The information necessary for the formation of an opinion on this point was readily afforded me by the hospital authorities and the medical staff.

Reception of infectious fevers into general Hospital.

The Fever Ward, as already explained, is one of the two pavilions opening out from the central corridor at its furthest point from the administrative block, and the pavilion opposite to it is fitted up as a dormitory for the nurses and probationers. A doorway situated in the lantern lobby shuts off these two portions from the remainder of the hospital, and there are also doors shutting off the corridors leading to each of the wards from the lobby. It is a rule that these doors, and also the doors of the two wards themselves, shall always be kept shut. There is also a separate fever laundry and an efficient disinfecting apparatus ; the latter being that manufactured by Messrs. Goddard and Massey, of Nottingham. Fever patients, in their passage from the fever reception-room to the Fever Ward, do not pass within 45 feet of any of the wards occupied by patients ; they keep in a separate part of the grounds during recreation hours ; there are also separate fever nurses, and a separate Fever-Ward maid. The medical staff and the matron are the only persons from the other parts of the building who are allowed to enter the Fever Ward,



and with a view of limiting the carrying to and fro of messages, telephonic communication has been established between that ward and the administrative block. The food for the Fever Ward is conveyed to the lantern lobby at the end of the ward window, and is there received by one of the fever nurses. These nurses must, however, pass nearly into the administrative block in order to reach their separate dining-room, and they also sleep in that block. The Fever-Ward maid, too, resides in the same building, but she has a separate room, and she is supposed not to communicate with other servants. Although owing to these latter arrangements, and also to the passage of the ordinary nurses, at least, twice a day, to and from their dormitory, across the lantern lobby leading to the Fever Ward, there are obvious means by which, even under the strictest administration, communication between the several sets of nurses, probationers, and servants may take place, yet it would be difficult to find any general hospital where the reception of infectious cases is subjected to stricter regulations with a view to their isolation, and there is probably none where the conditions affecting the patients themselves are more conducive to this end. Under these circumstances, I procured details as to the actual results which had attended the admission of fever patients to the hospital. (See Plate No. XXII.)

In the following statement which gives the facts for the four years 1877-80, all cases are omitted in which there are grounds for believing that the disease had been contracted prior to admission, or in which there is some doubt as to the exact nature of the disease supposed to have been contracted. Two cases of enteric fever assumed to have been contracted whilst in hospital are also left out of consideration.

In 1877\* the monthly average number of patients under treatment in the whole hospital was 70, and the total admissions were 560. During that year 18 patients in the ordinary wards contracted scarlet fever; and 3, including one who had been removed to the Fever Ward after contracting scarlet fever, contracted measles. Six patients also who were under treatment for measles in the Fever Ward contracted scarlet fever. Four of the patients who had contracted scarlet fever died.

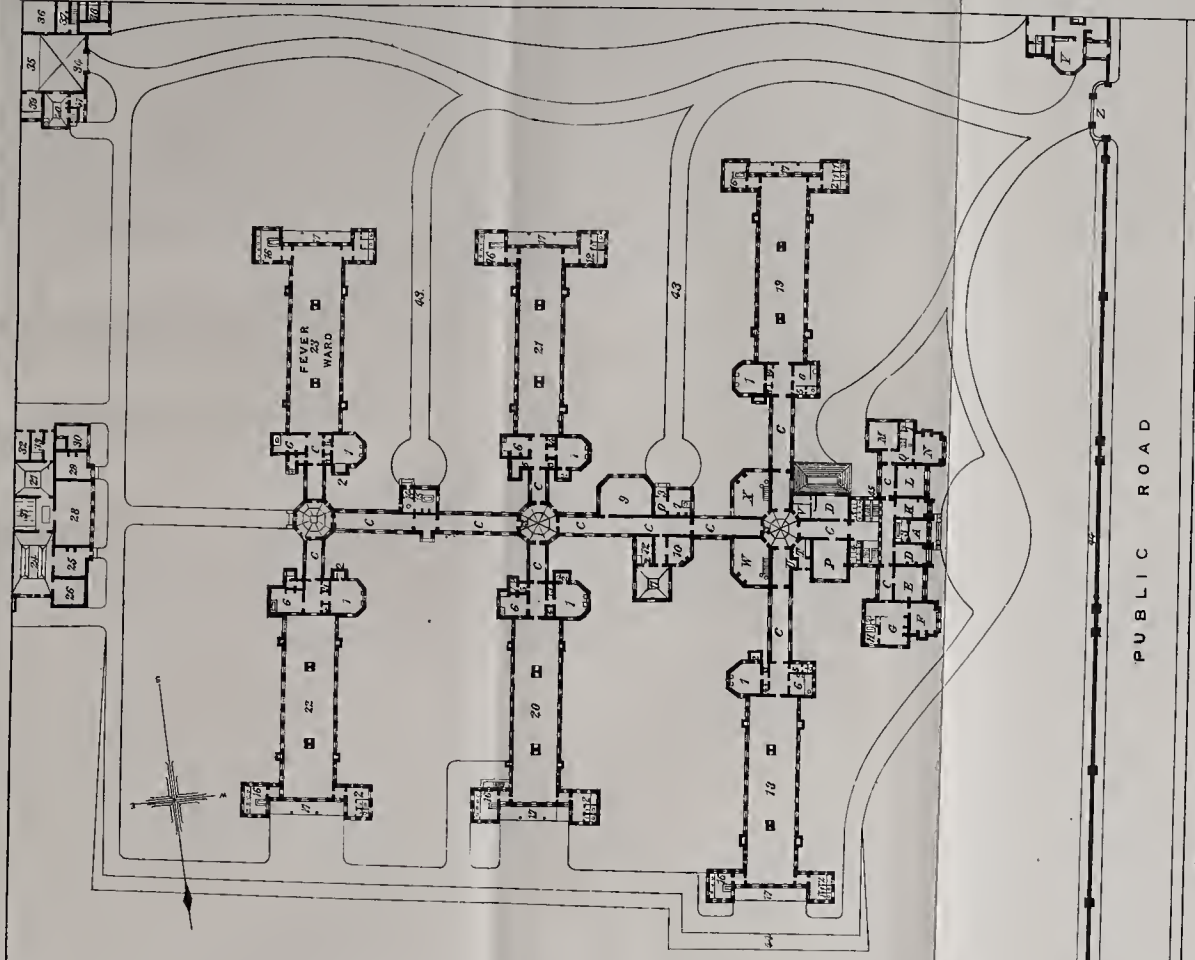
In 1878 the monthly average number of patients in the whole hospital was 90, and a total of 901 patients were admitted. In that year 14 patients in the ordinary wards contracted scarlet fever, and three contracted measles. Eight patients under treatment for measles in the Fever Ward contracted scarlet fever, and one who had been removed there, when he had contracted measles, suffering later on from scarlet fever. This patient and four others died of this latter disease.

In 1879 the monthly average number of patients in the hospital was 92, and a total of 858 patients were admitted. For that year 12 patients under treatment in the ordinary wards contracted scarlet fever, and 3 contracted measles. These three are, however, believed to have received the infection from a boy who came in during the incubative period of measles which had been contracted outside. Three patients under treatment for measles in the Fever Ward contracted scarlet fever. One of these latter and two others who had contracted scarlet fever died. Since the commencement of this year a record has been kept as to the spread of infection amongst nurses, and I find that in 1879 four out of a total of some 30 sisters and nurses not occupied in the Fever Ward contracted scarlet fever, and one of the 12 patients who was seized with

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\* During 1877 the pavilion now used as a nurses' dormitory was the Fever Ward, that pavilion and two others being the only ones then in use. Its situation as regards the other wards is, however, similar to that occupied by the present Fever Ward.





PUBLIC ROAD

A.	Vestibule
B.	Hall
C.	Corridor
D.	Senior Reception
E.	Dining Room
F.	Reception
G.	Stargazer's
H.	Water Clock
I.	Capboard
J.	Junior Reception
K.	Commissary
L.	Physician
M.	

W	Maintenance Room.
O	Staircase
P	Laboratory
Q	Passage
R	Lavatory.
S	Lavatory.
T	Service Room.
U	Dinner and Coal Lift
V	Housemaid's Partry
W	Linens Room
X	Nurses Dining Room
Y	Catchers Lodge
Z	Entrance Gate

	R E
1	Special Wards, 2 h
2	Sink Room.
3	Brushes
4	Living
5	Lobby
6	Scullery
7	Reception and Dressing
8	Parl.
9	Play Room.
10	Dispensary
11	Operation Room
12	Instrument Room

**E R E N C E S**

14 Entrance for Fire  
15 Fever Reception  
16 Laboratory and Bath  
17 Verandah  
18 Larder Ward  
19 Daywood Ward  
20 North do  
21 South do  
22 Nurses Dormitory  
23 Boarding or Fire

Room

Wash-house and Stable  
Office.  
24 General Wash-house  
25 Officials Wash-house.  
26 Spring Room.  
27 Power Wash-house  
28 Laundry  
29 Packing Room  
30 Feed Linn and Shovel  
Room.  
31 Drying Room.  
32

33 Engine Room  
34 Stable Yard  
35 Shed top-Horse  
36 Coach House  
37 Harness Room  
38 Stable  
39 Portico  
40 Post Northern Room  
41 Ante room  
42 Carriage Drive  
44 Terrace

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HOSPITAL FOR SICK CHILDREN, PENDLEBURY MANCHESTER

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that disease in one of the ordinary wards is believed to have had the infection communicated to him by one of the nurses.

In 1880 the average monthly number of patients in the hospital was 95, and 840 patients were admitted. In that year 12 patients in the ordinary wards contracted scarlet fever and 4 contracted measles. Three patients under treatment for measles in the Fever Ward contracted scarlet fever, and 4 under treatment there for scarlet fever contracted measles. Six of the scarlet-fever patients, including two who had been admitted into the Fever Ward for measles, died. During this year one nurse engaged in an ordinary ward contracted scarlet fever.

In estimating the value of the above facts it should be borne in mind 1<sup>o</sup>, that a degree of isolation which might suffice to prevent the spread of scarlet fever and of measles amongst adults would be insufficient for this purpose amongst children who are specially susceptible to receive those infections; and 2<sup>o</sup> that such diseases are specially liable to be communicated to patients in Hospitals for Children by means of visitors.

Having regard, however, to all considerations bearing upon this subject, the results both of treating scarlet fever and measles in this general hospital, and of treating those two diseases together in one and the same ward, cannot be regarded as otherwise than unsatisfactory.

In 72 of the instances in which patients in the general wards contracted an infectious fever whilst in the hospital, I have procured information as to which of the latter wards they occupied. I would here recall the fact that all the four general wards are of the same dimensions, and hold the same number of beds, and generally speaking it may be presumed that their occupants were equally numerous and equally susceptible to infection. This being so the intensity of "fever" infection reaching wards at various distances from a centre would be expected first to be measurable by the number of attacks at each distance; and secondly, to bear some relation to the several distances. Granting this it will be interesting to examine the facts.

Estimating the distances between the Fever Ward and the other wards as that lying in a direct line between the centres of the nearest adjacent walls, I find that of the 72 patients referred to—

20 were located at 95 feet from the Fever Ward.

13 " " 215 " "

30 " " 225 " "

9 " " 315 " "

Thus all the general wards suffered, but it is evident that no distinct relation exists between the number attacked and the distance at which they were located from the Fever Ward.

From the materials supplied to me I find that in 51 of the cases in which patients occupying the general wards were attacked with scarlet fever the following intervals elapsed between their admission and the date at which they contracted that fever:—

In 11 cases the interval was within from 5 to 7 days.

" 9 " the attack occurred during the 2nd week.

" 10 " " " 3rd "

" 4 " " " 4th "

" 2 " " " 5th "

" 4 " " " 6th "

" 3 " " " 7th "

" 1 " " " 8th "

" 1 " " " 9th "

" 1 " " " 11th "

" 1 " " " 12th "

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In 1 case the attack occurred during the 18th week.

" 1 "	" "	" "	20th "
" 1 "	" "	" "	22nd "
" 1 "	" "	" "	27th "
" 1 "	" "	" "	33rd "

The same information as regards measles was only procurable in 7 cases:

In 1 case the interval was 14 days.

" 2 cases the attack occurred during the	2nd week.
" 1 "	" 3rd "
" 1 "	" 7th "
" 1 "	" 9th "
" 1 "	" 11th "

Total amount  
of isolation for  
the city of  
Manchester.

Grouping together all the cases of infectious diseases treated in the Pendlebury Hospital for Sick Children and in the Monsall Hospital, together with the total mortality from the diseases specified in the City of Manchester, I am, in the following table able to show, with all but complete accuracy, the extent to which such diseases have been isolated during the three years 1878-80. A source of error, however, arises from the fact, that out of some 20 private patients annually received into the Monsall Hospital, a few, which cannot with certainty be distinguished, may have been received from sanitary districts outside Manchester.

Date.	Small-pox.		Scarlet Fever.		" Fever."		Measles.		Erysipelas.		Other Diseases.	
	Deaths registered in Manchester.	Admissions to Monsall Hospital and Pendlebury Fever Ward.	Deaths registered in Manchester.	Admissions to Monsall Hospital and Pendlebury Fever Ward.	Deaths registered in Manchester.	Admissions to Monsall Hospital and Pendlebury Fever Ward.	Deaths registered in Manchester.	Admissions to Monsall Hospital and Pendlebury Fever Ward.	Deaths registered in Manchester.	Admissions to Monsall Hospital and Pendlebury Fever Ward.	Deaths registered in Manchester.	Admissions to Monsall Hospital and Pendlebury Fever Ward.
1878 ...	1	9	346	163	137	94	169	68	29	61	?	25
1879 ...	1	6	336	151	76	67	137	15	19	74	?	27
1880 ...	2	2	332	191	89	69	196	13	23	49	?	33
Three years 1878-80	4	17	1,014	505	302	230	502	96	71	184	?	85

Disinfecting  
stove,  
destructor, &c.

In addition to the means of disinfection provided at Monsall and Pendlebury Hospitals, the Manchester Corporation have a disinfecting stove in one of the yards belonging to the Health Committee. It consists of a brick-vaulted chamber measuring 15 feet by 12 feet by 12 feet high, and is fitted with trellised teak shelves; hot air from a furnace entering the chamber by means of openings in the floor.

In connexion with the disinfecting chamber there is also a chamber for the destruction of infected articles by fire. Two vans are also kept, one being reserved for bringing infected articles, the other for returning the stoved articles to their owners.

It has been the practice, when articles have been submitted to the process of disinfection, to raise the temperature of the chamber to 240° F., and after this heat has been attained to maintain it during four hours. No articles have been scorched "for a long time." Recently it has been



ascertained by experiment that the heat indicated by a registering thermometer placed inside a flock pillow was only 155° F., at the end of the four hours' exposure, the heat in the chamber being maintained at 240° F. This led to some further experiments with a view of ascertaining under what circumstances a temperature of 250° F. could be made to penetrate a flock pillow.

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The stove not having been in use for between two and three days, the thermometer was found at the commencement of the experiment to stand at 85° F., and it required 5½ hours to raise it to 155° F., 3½ cwt. of coke being consumed for the purpose. After four hours undisturbed exposure at this temperature, a registering thermometer inside the pillow stood at 170° F., and after a similar exposure of six hours it stood at 222° F. It was subsequently ascertained that it required an undisturbed exposure of 10 hours for a temperature of 250° F. to penetrate to the middle of the pillow; 4½ cwt. of coke being consumed.

When cases of infectious diseases are reported to the Medical Officer of Health, the infected houses are visited, and disinfectants gratuitously supplied. On the removal of the patients to hospital, or on their recovery when treated at home, the rooms are "fumigated," and the walls are stripped of their paper and washed down with a strong solution of caustic soda; four "strippers" and four "disinfectors" being constantly engaged for this purpose. The clothing, bedding, &c. are also removed to be dealt with in the disinfecting stove.

No charge is made by the Corporation either for dealing with infected premises or infected articles.

The following Table shows the amount of work done during the two years 1878-79, as regards disinfection.

Articles Disinfected.					1878.	1879.
Blankets	...	..	...	...	666	598
Sheets	...	...	...	...	396	315
Pillows	...	...	...	...	693	552
Bolsters	...	...	...	...	317	244
Quilts	...	...	...	...	349	294
Mattresses	...	...	...	...	633	531
Beds	...	...	...	...	398	268
Carpets	...	...	...	...	416	317
Articles of clothing	...	...	...	...	874	1,024
Sundries	...	...	...	...	858	787
					5,600	4,930
Houses disinfected...	...	...	...	...	586	644
Rooms disinfected...	...	...	...	...	2,142	2,269

The ambulance maintained by the Corporation is fitted to hold two movable stretchers, both of which are so arranged as to enable the patient to occupy a sitting or recumbent position. An attendant has a seat on the box beside the driver, from whence the patient can be constantly kept in view, and also reached if necessary. A case containing a stimulant is always at hand.

Ambulance.

A mortuary has also been provided by the Corporation. It has been mainly used for the reception of bodies of persons dying in lodging houses, or under circumstances calling for inquests. In a few instances, however, the bodies of persons dying from infectious diseases in crowded tenements have also been removed there.

Mortuary.

## MARYPORT URBAN SANITARY DISTRICT.

Population in 1881, 8,177.

## APP. NO. I.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Nature of  
existing  
hospital.

In the town of Maryport a building, formerly forming part of a brewery, was converted, about 25 years ago, into a hospital for infectious diseases by the Guardians of the Cockermouth Union. The hospital still belongs to the Guardians, the meagre furniture it contains is theirs, and whenever patients are in, the general administration of the building is in the hands of the relieving officer. Since 1872, however, and in consequence of a fear that cholera might be imported by means of shipping, the Urban Sanitary Authority of Maryport, who are also the trustees of the port, have paid 5*l.* a year to the Guardians for the privilege of sending into the hospital any cases of infectious diseases imported by shipping or otherwise.

The building stands on a very limited area of rapidly sloping ground. It consists of three stories; the upper one, which is provided with a separate entrance, being alone used for the purposes of a hospital. This upper floor consists of five rooms, all opening into a common passage. Two of these rooms, one at either end, have each a capacity of about 360 superficial and 2,600 cubic feet. The windows are so placed as to secure cross ventilation. These two wards contain as many as three beds each. A third ward containing two beds has a single window on one side only, and has a capacity of about 1,000 cubic feet. All these three rooms are warmed by open fire-places. The remaining two rooms are set apart for a woman who takes care of the building in return for residing there with her daughter rent free, and one of them has also to serve the purpose of a kitchen. When patients are in she has to act as nurse, and receives 15*s.* a week, out of which she is expected to find her own board.

Water-supply  
and drainage.

The town water is laid on, and the drains, the inlets to which are outside the building, communicate with the town sewer. Detached is a wash-house, and also a pail-privy.

Admission of  
patients.

There does not appear to be any record of patients admitted to this hospital, but I learn from Dr. Pearson, Medical Officer of Health for Maryport, that since 1872, three patients have been sent in by the Urban Authority, all three being cases of small-pox brought in by ships. In these cases the Sanitary Authority have repaid to the Guardians the costs of maintenance and of nursing, and they have themselves provided medical attendance.

Overcrowding.

This hospital as a pauper institution has, however, contained as many as six and seven patients at a time, the majority being cases of small-pox and typhus imported from Ireland. Under such circumstances the defective arrangements of the building for the purpose of a hospital for infectious diseases, and the want of proper cubic and floor space for the number of beds, have been very obvious. Especially has the want of accommodation for nurses been felt, and I am informed by Dr. Pearson that several of the latter have contracted "fever" within the building and have died.

Influence of  
hospital on  
surrounding  
neighbour-  
hood.

The position of this hospital as regards neighbouring buildings has further to be noticed. The premises lie immediately behind Nelson Street, one of the poorest and most densely populated streets in Maryport. One dwelling-house is in actual contact with the main building, and a second house divided into two tenements, one above the other, lies within 5 feet of it. One of these tenements consists of the upper two floors, and is entered at the back from a passage at a high level; the other consists of the lower two floors, which abut against the higher



lying ground at the back, and is entered at the front from a small yard below. Unfortunately no accurate information could be procured as to the prevalence or the absence of infectious diseases in the neighbourhood of the hospital; the Medical Officer of Health not being even provided with any returns of death. He, however, assured me, as the result of long-continued observation as a medical practitioner in Maryport, that, considering the character of the dwellings in Nelson Street, it had often been a matter of surprise to him that this street had remained so free from such diseases. Indeed so markedly absent have they been that he has been in the habit of attributing their absence to the freedom with which the street is swept by the breezes from the sea close by. And as regards the houses in the immediate vicinity of the hospital, he had never heard it suggested that disease had been communicated to their inmates from that building. Inquiry at these houses resulted in the assurance that no cases of infectious diseases could be remembered there beyond two cases of scarlet fever in the children of the family residing in the lower of the double-tenemented house. These cases were further ascertained to have occurred when the hospital was empty.

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#### MIDDLESBROUGH.

Population in 1881, 55,288. Rateable value (1880) 214,403*l*.

The existing hospital for infectious diseases in Middlesbrough was first opened in 1872 in substitution for one of a temporary character, which had been provided in 1866 in anticipation of the importation of cholera into the country. The building as it now exists was however not completed until 1874.

The site consists of one acre and an eighth of land occupying a well isolated position to the south-west of the town, in view of the Cleveland hills, and about 150 yards from the nearest residence. The land consists of a light clay soil; it is freehold and belongs to the Corporation. Owing to a somewhat recent extension of the Cemetery grounds, the hospital premises and the latter now adjoin.

Site and soil.

The hospital consists of a central administrative block flanked on either side by ward-pavilions, and also of certain out-buildings. A covered passage having open spaces at the sides forms the means of communication between the administrative block and the wards. The position of the buildings being somewhat exposed, the openings in this passage have recently been fitted with sliding doors which can be partially closed in severe weather.

Hospital  
Buildings.

The administrative block is a three-storied building with a basement below. In the basement are a beer cellar, a wine cellar, a store-room, and a boiler room. On the ground floor are, an entrance hall, a matron's room, a servants' sitting room, a servants' dining hall, a surgery, and a waiting room, in addition to a kitchen with scullery, pantry, &c., in a separate projection. On the first floor is a house surgeon's sitting room, four bedrooms, and a bath-room. On the second floor are six bedrooms for nurses, a lavatory, and two waterclosets.

Each ward-pavilion contains two floors, and the accommodation in both pavilions is alike. To the front on each floor is a small ward 24 feet 3 inches  $\times$  12 feet  $\times$  14 feet 6 inches = 4,219 cub. feet. These small wards, of which there are thus four, were originally intended as convalescent wards; they are furnished with three beds each, but are occasionally used, as at the date of my visit, for single patients. At



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the rear of the building and on each floor is a ward measuring 24 feet  $\times$  28 feet  $\times$  14 feet 6 inches = 9,744 cub. feet. These wards are furnished with nine beds, although according to the original plans they were evidently only intended to receive six beds each. These larger wards are well lighted and ventilated. They are provided with four double-hung sash windows, two on either side, surmounted by a pivot-hung sash which opens in a hopper towards the ward. This sash is arranged so as not to entirely close, some air always entering the ward by means of a layer of fine iron gauze, fitted in the top of the hopper. Each of the four windows has a superficial area of about 37 feet. A space above the door of the wards is louvred, and air bricks are fixed near the level of the ceiling. The wards are warmed by open fire-places. The smaller wards resemble the larger ones as regards means of warming and ventilation in all respects except one, the difference being that the windows are in adjacent walls and hence do not admit of complete cross ventilation.

Between the smaller and larger wards on each floor are 1<sup>o</sup>, a nurse's sitting-room having a fixed window looking into both wards, and 2<sup>o</sup>, a small room used as a bath-room and lavatory.

The outer walls of the wards are 14 inches thick, including a two-inch internal cavity.

The total accommodation now afforded by the hospital is 48 beds, but that for which it appears to have been intended, and for which it is better adapted, is 32.

The hospital, however, as now constructed, is only a part of the original design which was prepared by Mr. E. D. Latham, C.E., the borough surveyor. Pending its completion waterclosets have been added to the pavilions which open into wards by means of a lobby which is not provided with means of cross ventilation, and to this extent the arrangement is faulty.

Disinfecting  
stove, &c.

The outbuildings consist of servants' closets, a laundry and wash-house, and a mortuary. In the laundry is a Nelson's disinfecting stove, which is heated by means of charcoal in a tray beneath. Some articles appear to have been scorched in it whilst being stoved. An ambulance, which is an old carriage stripped of its cloth linings and lined with leather, is kept in a yard in the town. The carriage has been so fitted that a patient can lie down in it, and after each use it is washed out with a solution of carbolic acid, and then with water.

Water-supply  
and drainage.

The premises are provided with water from the mains of the Borough Waterworks, and they are drained into the public sewer.

Admission of  
patients.

At the date of my visit to the hospital 10 patients were under treatment: three were cases of enteric fever, seven were children suffering from measles.

The total number of patients who have been received into the hospital during the four years 1876-79, and the diseases from which they have suffered, have been as follows:—

Date.	Total Number.	Small-pox.	Scarlet Fever.	Enteric Fever.	Measles.	Other Diseases.
1876 ... ..	33	5	—	28	—	—
1877 ... ..	55	2	4	48	—	1
1878 ... ..	70	—	17	50	2	1
1879 ... ..	50	1	28	21	—	—
1876-79 ... ..	208	8	49	147	2	2



Several authorities have entered into an agreement with the Corporation of Middlesbrough for the use of this hospital as a means of isolation for cases of infectious diseases arising within their jurisdictions, and hence all the above cases do not properly belong to the borough. In the first place the guardians of the Middlesbrough Union have arranged to send in all pauper cases of infectious diseases needing isolation, including any cases arising in the workhouse itself, at a rate of 5s. per diem for each case, and a fee for the use of the ambulance. The guardians have made considerable use of the hospital as is shown by the following table, which also indicates the locality from which the patients were admitted.

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Admission of paupers.

PATIENTS received into the MIDDLESBROUGH HOSPITAL for INFECTIOUS DISEASES.

Date.	Total Number from all Sources.	Total Number of Paupers.	Number of Paupers admitted from	
			The Borough.	Other parts of the Union.
1876 ... ..	33	29	28	1
1877 ... ..	55	46	31	15
1878 ... ..	70	52	44	8
1879 ... ..	50	39	36	3
1876-79 ... ..	208	166	139	27

It is not often that it is necessary to send in cases direct from the workhouse, and the reception of out-door paupers is stated not in any way to have interfered with the general use of the hospital for other classes. Indeed, I am assured that it is rarely if ever known whether the patients are paid for by the guardians or not. So far, also, all workhouse inmates who have been received have been children, and as they wear no distinctive dress, their reception into the wards is not believed to have had the effect of identifying the hospital with pauperism. It must, however, be noted that the use of the hospital for the non-pauper class has as yet been only small, for whereas as many as 166 paupers were admitted in the four years 1876-79 only 42 patients were from the non-pauper class.

The Normanby Urban Sanitary District in April 1877 made an arrangement with the Middlesbrough Corporation by which they could send patients to this hospital at the rate of 2l. 10s. per week for each patient. According to a report by the Medical Officer of Health to the Normanby District, scarlet fever and measles were epidemic there in 1877 and 1878, and the spread of the disease was much increased owing to "the free intercommunication of members of healthy families with those where the disease prevailed." He further adds that, "had moderately efficient isolation been practical, I feel confident that the spread of those diseases would have been materially checked." This Authority had, however, up to April 1880, not sent a single case to the hospital. In this connexion I would note that the Normanby district has a population of some 8,000, mostly lying in two centres: one is nearly four miles, the other five miles distant from the hospital.

Failure to secure isolation on the part of—  
(a) Normanby Urban Authority.

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(b) Ormesby  
Urban  
Authority.

(c) South  
Stockton  
Urban  
Authority.

(d) Middles-  
brough Rural  
Authority.

Use of Hospital  
by Middles-  
brough Rural  
Corporation.

Payment by  
patients.

General and  
medical ad-  
ministration

The Ormesby Urban District have an arrangement on similar terms. Towards the end of 1879 scarlet fever became epidemic in the district, causing 20 deaths. The disease is stated to have been "entirely confined to cottage houses," but no cases were sent in by the Sanitary Authority; two paupers being the only patients admitted from this district. The principal population of the district is at North Ormesby, which contains about 7,000 inhabitants and lies two miles away from the hospital. The remainder of the district contains a scattered population of about 1,000.

South Stockton is a third urban sanitary district which professes to have hospital accommodation for its inhabitants, by arrangement made in March 1878 with the Middlesbrough Corporation, the population to be served by this provision lying within  $2\frac{1}{2}$  miles of it. Scarlet fever had been very fatally epidemic in the district just prior to my visit, having caused as many as 59 deaths in the 15 months ending March 1880. Notwithstanding this, however, not only had no cases been sent to the hospital, but the question of utilising the hospital for the purposes of isolation had not even been considered by the Sanitary Authority.

Finally, the rural sanitary district of Middlesbrough has agreed to similar terms for the isolation of cases of infectious diseases occurring in their district, and in one instance, namely, on the occurrence of a case of small-pox in 1879, a patient had been sent in. Out of a population of about 7,000 in this rural district, Eston has some 5,000 inhabitants, and it lies nearly six miles from the hospital. This distance is admitted to be the principal reason why more use of the hospital has not been made.

With regard to the use of the hospital by the Urban Sanitary Authority of Middlesbrough, it appears that in addition to paupers, 4 patients were admitted in 1876, 8 in 1877, 18 in 1878, and 10 in 1879; or 40 in all. Of these 13 were paid for either by the patients themselves or by their friends, the cost attendant on the isolation and care of the remainder being borne by the Corporation.

When the hospital was first opened, it was determined that all patients from the borough, including paupers, should be paid for at the rate of 1*l.* 1*s.* per week. Later on the Town Council being desirous of encouraging the use of the hospital resolved that since it had been erected, and was to be maintained at the public expense ratepayers and their families, including servants, were to be admitted free; but that paupers were to be paid for at the rate of 5*s.* a day. With regard also to medical attendance and board it was deemed desirable to make no charge for non-paupers, and although in 13 instances payment has been made, generally at the rate of 2*l.* 10*s.* a week, it has, as a rule, been made voluntary; the exception being in the case of persons, not resident within the borough, who, during a stay there, have sickened with some infectious disease. Even in the latter cases, however, no guarantee as to payment is demanded, the first object of the Authority being to secure immediate isolation, where any danger to the public health would arise from the patient being left in his home or lodging.

The hospital is under the immediate control of a hospital committee of the Town Council. The present staff consists of 1st, a non-resident medical officer, who is also Medical Officer of Health for the borough, and who receives 150*l.* per annum for the medical and administrative care of the hospital; 2nd, a matron at 50*l.* a year; 3rd, two permanent nurses receiving between them 37*l.* a year; 4th, a ward maid at 10*l.* a year; a cook at 20*l.* a year; and a laundress at 16*l.* a year. A porter has usually been employed in addition, but for some time past his services have been dispensed with.



The original cost of the hospital and premises were :

	£	s.	d.
Purchase of site - - - -	256	0	0
Buildings - - - - -	5,732	10	2
Fittings and furniture - - -	1,095	18	2
	<u>£7,084</u>	<u>8</u>	<u>4</u>

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Cost of construction and maintenance

The current expenses for the three years 1877-79, including salaries, but excluding interest on original outlay, and all monies repaid by the guardians or by private patients have been—

	£	s.	d.
1877 - - - - -	574	2	4
1878 - - - - -	334	15	6
1879 - - - - -	500	1	1

The total cost of maintaining the hospital and the patients in 1879 was 753*l.* 17*s.* 11*d.*, but a sum of 210*l.* 7*s.* 8*d.* was received from the guardians for the isolation and treatment of pauper patients, 42*l.* 19*s.* 2*d.* was paid by private patients, and 10*s.* was realised on the sale of some grass, reducing the costs to 500*l.* 1*s.* 1*d.* as above named.

#### NEWARK URBAN SANITARY DISTRICT.

Population in 1881, 14,019.

In 1874 scarlet fever became epidemic in Newark causing as many as 62 deaths. On the cessation of the outbreak Dr. Alfred Ashby, the Medical Officer of Health for the Grantham, Newark, and Sleaford Combined District, urged upon the Newark urban and rural authorities the desirability of their combining for the erection of a permanent hospital, which should for the future be in readiness for the isolation of infectious diseases. In 1875 it was decided to act on this advice, but finally the plan fell through.

On the 20th of April, 1877, a vagrant came into Newark suffering from small-pox, and found accommodation in a common lodging-house. The case was not reported to the Sanitary Authority until a month later. A second case occurred in the same lodging-house on June 5th, but the patient removed, first into a neighbouring lodging-house, and then into an adjoining sanitary district, where she died.

Small-pox epidemic leading to hospital provision.

Four fresh cases, all occurring in the second lodging-house referred to, followed in the week ending June 21st, and no means of isolation being available, the disease then gradually spread. Six fresh cases occurred between July 6th and 26th, eight in the week ending August 2nd, 30 more in the next week, and 19 others at intervals between August 16th and November 1st.

Early in the course of the epidemic Dr. Ashby urged upon the Newark urban authority the erection of a temporary wooden hospital, and this course was at once determined on. Delay, however, ensued owing to the difficulty of procuring a site. It was also found necessary under section 174 of the Public Health Act that 10 days' notice should be given before the contract for the erection of the hospital could be entered into, and it was not until July 23rd that a beginning could be made. The number of patients needing isolation had by this time considerably increased and tents were ordered in addition to the wooden building. The hospital was at last sufficiently ready for occupation on the 9th of

APP. No. 1. August, some 50 cases and 4 deaths having in the meantime taken place.

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Site and soil.

The site was a pleasantly situated and well-wooded grass field on the outskirts of the borough, near the Great Northern Railway line. The soil was loam overlying gravel. When I visited the hospital whilst in full use I found that gravel paths had been made from the road to the various erections, flower beds surrounded some of the tents, and the latter, gaily dressed with flags, gave to the encampment rather the character of a flower show than of a hospital. The various hospital constructions at the date of my visit were as follows:—

Wooden buildings.

1st. A wooden pavilion very similar to those referred to in the Board's memorandum on hospital accommodation. This building contained two wards, each of which measured 505 superficial and 7,430 square feet, and held four beds. The building also contained a dispensary, store-rooms, a bath-room, a nurse's room, and earth closets. In connexion with this pavilion was a detached kitchen and a wash-house, also of wood. The kitchen hut contained rooms which were used as additional store-rooms.

2nd. A single wooden hut containing 800 cubic feet was procured as a bedroom for a nurse. This building was provided ready made by Messrs. Lascelles of Bunhill Row, E.C., and, according to Dr. Ashby, "it was put up in three-quarters of an hour from the time it was got "on to the ground."

3rd. A double-lined wooden hut for the staff. This contained compartments, each measuring 142 superficial and 1,358 cubic feet. One of the compartments contained a stove.

4th. Additional wooden structures were erected as closets, lamp-room, mortuary, &c.

5th. Two Hospital Marquees, four "Netten-Radcliffe" tents, and a bell tent, all of which were provided by Messrs. Piggott Brothers, of 59, Bishopsgate Street Without, E.C., were also put up. (See Plates.)

Hospital tents

The Hospital Marquee in question is a well-proportioned tent, 30 feet long, 16 feet wide, 7 feet high at the sides, which are perpendicular, and 14 ft. 3 in. to the ridge pole. It contains 400 superficial feet and 3,800 cubic feet. The walls and roof are of double canvas soaked in a solution of tungstate of soda in order to render it unflammable, and the whole stands on a floor which is well raised above the surrounding ground, by means of wooden sleepers and joists. The sides are made to loop up and down at pleasure, and the roof contains three ventilators on either side and one at each end, all of which can be made to open into the marquee directly or indirectly through the double lining. Each of the marquees in use at Newark received either four acute or six convalescent patients. [A doorway awning or porch is now added to each marquee, and it can be fitted either at one end, or in the centre of one of the side walls.]

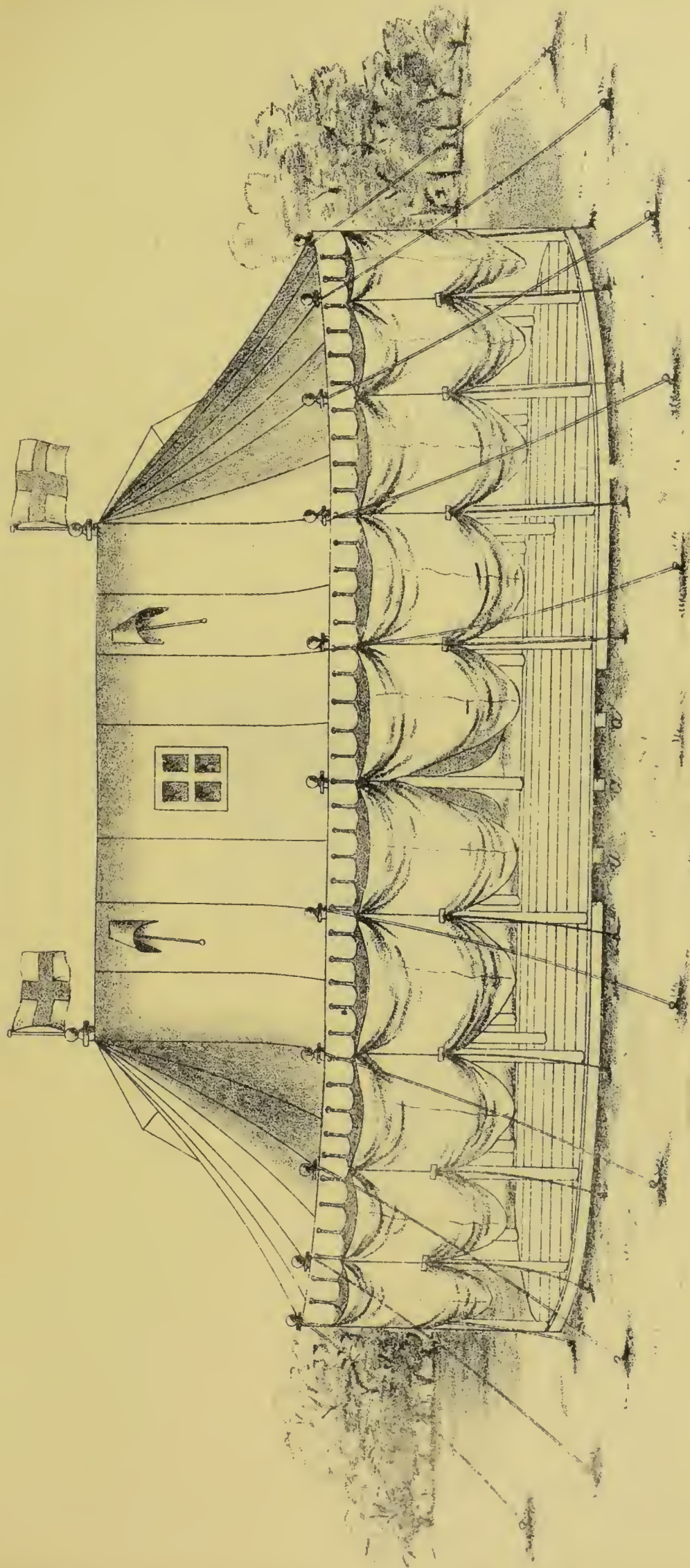
The Netten-Radcliffe tent is oblong in shape, and, like the marquee, it is lined throughout. It is 16 feet long, 14 feet wide, and 13 feet high to the ridge pole. It has perpendicular canvas walls 3 feet 6 inches high, and above these it slopes the remaining 9 feet 6 inches. Altogether it encloses 1,850 cubic feet. Some of these tents when in use at Newark held two patients each, others were reserved for nurses and staff.

The bell tent was reserved for the resident medical officer in charge of the hospital encampment.

The hospital remained in use until November 24th, 38 patients having been admitted. My visit was paid in the month of October, subsequent



THE HOSPITAL MARQUEE.



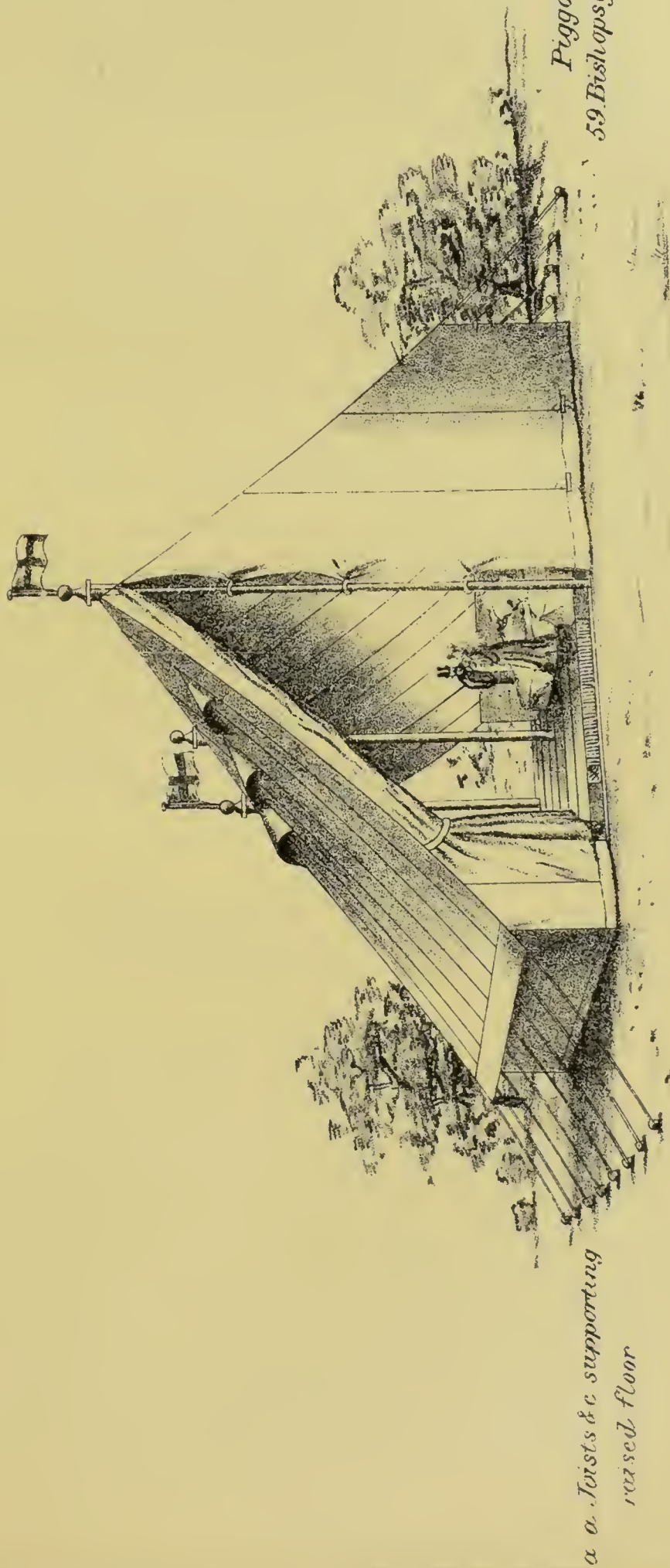
*a. a. a Joists supporting  
raised flooring.*

*Piggott Bros.  
59 Bishopsgate Without E. C.*





THE NETTEN-RADCLIFFE HOSPITAL TENT.



*a. Twists &c. supporting  
raised floor*

*Piggott Bros  
59 Bishopsgate Without  
E.C.*





to a period of a very heavy rainfall, and at a date when the nights were getting cold, and when petroleum stoves had, in consequence, been fitted up in the tents; a dangerous method of warming which has since, at Dr. Ashby's suggestion been superseded by the use of hot-water pipes (*vide* Report on St. Pancras Parish Hospital Provision, page 166).

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I, however, found that all the patients, without exception, greatly preferred the tents to the wooden pavilion, and I was assured that no rain had made its way through the double roofs, and, that adequate ventilation being maintained, the tents were without difficulty kept sufficiently warm at night.

The water-supply for this hospital encampment was sent daily by means of tank-carts from Newark. The slop-water was disposed of by means of one of Mr. Rogers Field's flush tanks which emptied itself by means of a drain pipe on to a piece of well-drained ground which had been converted into a vegetable garden.

Water supply  
and drainage

The wooden erections still remain on the site, and by means of them the Urban Authority isolated two cases of scarlet fever on March 1st, a third on March 9th, and one case of small-pox on March 27th, 1878, no further attacks of either disease taking place in the localities from which the patients were removed. In January 1879 it was again proposed to remove two children suffering from scarlet fever into the wooden pavilion, but in view of the severity of the weather and the temporary character of the building, the idea was abandoned.

The cost incurred in connexion with this hospital provision for the small-pox outbreak in 1877 was as follows:—

	£	s.	d.
Site, one year's rent	-	-	-
Two marquees, four Radcliffe tents, bell tent, and single hut	-	-	-
Wooden pavilion and huts, and outbuildings	195	3	3
Furniture and fittings	368	8	8
Medical attendance and nurses	296	12	7
Tradesmen's bills and sundries	228	3	5
	206	17	11
	£1,295	5	10

The expense of a double-walled marquee with doorway-awning, &c., is 39*l.* 15*s.*, and the flooring costs 11*l.* 11*s.* more. That of a double-walled Radcliffe tent is 23*l.*, with an additional sum of 6*l.* 10*s.* for flooring.

#### NEWCASTLE-UPON-TYNE.

Population in 1881, 145,288. Rateable value, 717,831*l.*

The hospital for infectious diseases at Newcastle-upon-Tyne was built in 1802, by public subscription, one of the grounds of its erection being that it was deemed inadvisable to receive cases of infectious disease into the Newcastle Infirmary.

It is a large, square three-storied stone building, standing upon about three-quarters of an acre of land. On the ground floor are the various administrative apartments and a ward which is now too damp to be used. On the first floor are three wards for the reception of 16 patients, and on the second floor there is the same accommodation, or 32 beds in all. The various floors communicate with each other by means of a central staircase, and in many other respects the building is but ill-adapted to the treatment of two or more infectious diseases at

Hospital  
buildings.

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the same time. Indeed patients admitted with one disease have, prior to their discharge, contracted a second within the building. When the wards are full the amount of cubic space per patient is only 600 feet; and the ventilation of the wards cannot be efficiently maintained except at the risk of producing draughts dangerous to the patients. The waterclosets open directly into the principal passages in the body of the house; and the interior of the building is in unbroken communication with the drains leading to the public sewer—defects which have been fully recognised, but which have not been remedied, owing to a proposal to rebuild the hospital. The building, too, is obviously old, and to some extent dilapidated, and the wards themselves have a somewhat comfortless appearance. Notwithstanding this, however, its history shows that it has been of the greatest service to the borough, and also to the surrounding neighbourhood.

In addition to this permanent building there is also in the hospital grounds, a double-walled wooden building originally erected on the Town Moor in anticipation of cholera. It was removed to its present position in 1871, for the reception of cases of small-pox, that disease being then epidemic; and since that date it has occasionally served the purpose of isolating cases of typhus or small-pox, when the main building has been in use for other diseases. This wooden hospital is in many respects ill-constructed, and it is now becoming somewhat dilapidated. It has hitherto afforded accommodation for 24 patients in two wards partially separated from each other by a wooden partition which does not reach the ceiling.

Payments by  
patients, &c.

On the hospital premises are also a disinfecting stove, an ambulance shed, a mortuary, and a coach-house.

From the date of its erection until 1873, the hospital was entirely in the hands of the subscribers by whom it was maintained, and no patients were admitted into it unless payment was guaranteed in advance, either by the patients themselves, their friends or by the Guardians of the Union from which they were received. Originally the rate of payment was 3s. per diem, but this was some 40 years ago reduced to 2s. per diem.

Admission of  
patients from  
1864 to 1873.

The extent to which the hospital was used; the varying localities from which many of the patients were received; and the number that were sent in by Poor Law Authorities, may be judged of by the annexed Table.

Sources from which the patients were derived.	1864-65.	1865-66.	1866-67.	1867-68.	1868-69.	1869-70.	1870-71.	1871-72.	1872-73.
From the Guardians of the :—									
Newcastle Union ...	78	436	262	359	134	167	343	783	?
Gateshead Union ...	98	94	—	—	—	—	—	—	?
Tynemouth Union ...	9	3	7	24	4	9	4	—	?
South Shields Union ...	7	—	1	—	—	2	3	—	?
Castle Ward Union ...	1	—	—	2	7	1	1	4	?
Sailors ...	26	13	19	8	13	6	16	9	?
Domestic servants...	23	7	3	2	7	9	14	51	?
Others ...	1	9	6	5	10	13	13	33	?
Totals ...	253	562	298	400	175	207	394	880	230



In 1873, however, the hospital was transferred to the Urban Sanitary Authority, the transfer taking place at about the same date as the appointment of Mr. H. E. Armstrong as Medical Officer of Health for the borough. To him was assigned by the Corporation not only the management of the hospital, but also the medical care of all the inmates, he being immediately responsible to the Sanitary Committee of the Town Council. This arrangement is still in force.

During the six years since the hospital has come under the control of the Sanitary Authority the number of patients admitted has been as follows:—

1874	-	-	-	-	116
1875	-	-	-	-	122
1876	-	-	-	-	58
1877	-	-	-	-	39
1878	-	-	-	-	65
1879	-	-	-	-	38
Total					438

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On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.  
Transfer of  
hospital to  
Urban  
Authority.  
Admissions  
since 1873.

It will be at once observed that the number of patients, when contrasted with the period immediately preceeding 1873, exhibits a remarkable falling off. This is, doubtless, to a very large extent due to the circumstance that there has been no recurrence of such epidemics as that prevailing from 1865 to 1868, and which was due to typhus, or as the small-pox epidemic of 1871-73, and also to the fact that since that date cases have not been received from outlying unions. At the same time, however, it is to be believed that the hospital itself has played a not unimportant part in effecting a diminution of infectious disease in the borough, and that this also has necessarily had to do with the decrease in the number of patients.

Prior to 1873 a large number of cases of infectious disease were treated at the homes of the patients by the medical staff attached to the Newcastle Dispensary. Since the hospital has been transferred to the Sanitary Authority, notice of the existence of infectious disease has daily been forwarded to Mr. Armstrong by the dispensary staff, and whenever it has been deemed necessary, an effort has been made to secure the isolation of the patients in the hospital. In the case of typhus this effort has very generally been successful, but with regard to enteric fever, scarlet fever, and measles the degree of success has been much less important. Prior to 1873 also no case could be admitted except on payment, and the consequence was that when fresh cases of typhus occurred amongst the labouring classes the necessity of providing for payment prevented the isolation of the case. The disease spreading, however, whole families were attacked; they then necessarily became paupers, and in many cases they were all removed to hospital at the expense of the Guardians. Mr. Armstrong, himself connected with the Dispensary from 1857 to 1873, well recollects instances of this sort, in which six and seven cases from one household were sent to the hospital at the same time, and he is convinced that the early intimation of sickness amongst the dispensary patients, together with the increased facilities for admission to hospital, has in a great degree saved the borough from the spread of typhus. The hospital, too, owing to the large number of cases formerly sent in by the Guardians of various unions acquired to some extent the reputation of a pauper institution, and it is known that this prevented the more respectable of the labouring classes from allowing the removal to it of members of their families, and thus

Partial  
notification of  
Infectious  
diseases.

Payments  
hindering  
isolation.

Admission of  
paupers.

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the spread of infection was favoured, and the numbers ultimately admitted was greatly swelled.

The hospital, it is true, is still used for the reception of paupers within the borough of Newcastle-upon-Tyne. But the Guardians have informed Mr. Armstrong that whenever he finds a case of infectious disease in a family, who in his opinion would by reason of the prevailing sickness become pauperised, he is at liberty at once to remove the case to hospital on their behalf. The case is at once reported to them, and if the opinion is well founded, the Guardians bear the cost; if not, the expense is borne by the Sanitary Authority, who have granted to Mr. Armstrong discretionary power to admit free cases. The patient is, however, in no such instance informed of the source of payment, hence it is not publicly known to what extent the Institution is still used for pauper purposes, and the deterrent effect of such use is in consequence believed to be much less general than it formerly was. Out of a total of 438 patients admitted in the six years 1874-79, during which period the hospital has been under the control of the Urban Sanitary Authority, there were 215, the cost of whose treatment was borne by the Guardians, and, quite apart from any question of payment, or from the occasional demand for the use of a private ward which has been made by some of the better classes, Mr. Armstrong finds that the disinclination to mingle with paupers does, amongst the mechanics and other similar classes, prevent the use of the hospital. The general want of attractiveness attaching to a building now out of repair, if not beyond efficient repair, must also be credited with some of the objections raised to removal to it, and it is wisely felt that before long the construction of an entirely new hospital admitting of some classification of patients as to sex, disease, and to a certain extent also as to social status, should be entertained rather than any attempt to repair the existing building.

Isolation at the  
cost of the  
Urban  
Sanitary  
Authority.

Of the remaining patients admitted in the six years 1874-79, 142 have been maintained at the cost of the Urban Sanitary Authority, and the expenses of the other 81 have been defrayed by the patients themselves or by other private individuals. The non-pauper patients have been almost entirely derived from the ranks of the poorer mechanics and labourers, together with a few domestic servants, and employés in houses of business.

Cases isolated  
in three years  
1877-79.

The diseases under which the patients admitted in the three years 1877-79 suffered, and the total number of deaths occurring from those diseases in the borough during the same period, is shown in the next Table.

	1877.		1878.		1879.	
	Patients admitted into Fever Hospital.	Total Deaths in the Borough.	Patients admitted into Fever Hospital.	Total Deaths in the Borough.	Patients admitted into Fever Hospital.	Total Deaths in the Borough.
Typhus fever...	8	9	13	9	15	8
Enteric fever...	14	21	26	52	11	33
Continued fever	1	—	5	10	—	—
Scarlet fever...	11	69	14	219	8	284
Small-pox	2	1	—	—	—	—
Diphtheria	—	10	2	19	1	4
Measles	1	21	—	17	—	91
Other diseases	2	?	5	?	3	?

Expenses of  
administra-  
tion.

No information is now procurable as to the original cost of the hospital. The current expenses during the two years ending August 31st, 1878,



and 1879, including an annual fee of 100*l.* to Mr. Armstrong for medical and general supervision, have been as under :—

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	1878.	1879.
	£ s. d.	£ s. d.
Salaries and wages ... ..	238 18 8	236 6 10
Food, drink, wine, &c. ... ..	291 13 7	278 19 0
Other accounts with tradesmen ... ..	152 19 2	161 12 11
Insurance and rates ... ..	2 3 6	1 16 0
Repairs and furniture ... ..	77 14 8	139 0 6
	£710 14 7	£817 15 3

These sums, however, include the total cost for the treatment of all patients, whereas during the year ending August 31st, 1879, repayment was made for 29 out of a total of 38 patients admitted. The Guardians of the Newcastle-upon-Tyne Union became chargeable for 15, the Newcastle Infirmary for one, and the remaining 13 were private patients, nine of whom paid the full rate charged, namely, 14*s.* per week, and four a reduced rate of 7*s.* per week.

In 1878 the hospital was empty on three occasions, for 17, 5, and 14 days respectively; in 1879 it was also empty three times, for 37, 15, and 7 days respectively.

The authority has never found it necessary to resort to legal proceedings in order to recover the amounts charged to private or other patients.

The removal of patients from their houses has in certain instances been attended with some difficulty, owing to objections raised either by the patients themselves or by their friends. On all but four occasions these objections have been overcome; in several instances owing to accidental presence of a neighbour who has borne testimony to the comfort and kindness experienced by relatives who had formerly been patients in the hospital. In the exceptional instances, however, it was found necessary to resort to the powers vested in the Sanitary Authority under section 124 of the Public Health Act, 1875.

Section 124 of  
the Public  
Health Act,  
1875.

The first case occurred in 1877, when a single woman, aged 22 years, was found to be suffering from enteric fever in a low, damp, kitchen, situated in a row of houses built back to back, the apartment constituting the entire tenement for several other members of the same family. A magistrate's order having been procured the patient was removed without any further difficulty. Two other cases took place in 1878. The patients, who were suffering from typhus fever, both occupied single-roomed tenements in common with several other members of their respective families. In one instance the amount of cubic space per person was under, in the other somewhat over, 300 feet. The removal in these cases, even after the magistrate's order was obtained, was not so willingly assented to as in the former case, and it required some considerable moral pressure before it was effected. Both these patients, as also the one previously named, ultimately expressed their gratitude to Mr. Armstrong for the treatment they had received in the hospital.

In all the three cases referred to a police constable had, after the issue of the magistrate's order, accompanied the ambulance to the house of the person to be removed. In the fourth case, occurring early in 1879, in which an order was obtained for the removal of three patients suffering from enteric fever, from a crowded, damp, and ill-ventilated tenement, the co-operation of the police was refused on the ground that risk of infection would be incurred; and although the penalty

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Disinfecting  
apparatus.

imposed under section 124 for wilful disobedience of the order was explained to the wife and mother of the patients, it was evident that nothing short of forcible removal could be effected, and hence the patients were left at home. The matter was subsequently brought under the notice of the Sanitary Committee of the Town Council, but it was not thought advisable to take any further action.

The Disinfecting Apparatus already referred to is found to be of the greatest use. It is the stove designed by Dr. Ransom, and manufactured by Messrs. Goddard and Massey, of Nottingham. The stove is placed in the centre of a building specially adapted to receive it, and so divided into two apartments as to prevent any possible mingling of infected articles with articles already stoved. In every detail this stove is found to answer the purpose for which it is intended, and a uniform temperature of 245° Fahr. can be obtained in it without damaging the articles placed in it. Any persons resident within the borough can send infected articles to be disinfected free of cost, and the use to which this stove is put, both for the purposes of the hospital and for those of the borough generally may be judged of by the following table, which shows the number of articles dealt with during the three years 1877-79:—

Articles  
disinfected.

	From the Borough.	From the Fever Hospital.
Beds ... ..	159	43
Mattresses ... ..	235	53
Bed ticks ... ..	—	56
Bolsters ... ..	128	2
Pillows ... ..	340	200
Blankets ... ..	165	150
Curtains and rugs ... ..	80	97
Quilts ... ..	118	89
Cushions ... ..	27	—
Carpets ... ..	174	?
Linen and wearing apparel (articles singly or in sets) ... ..	375	263
Sets of books and toys and miscellaneous articles	141	75

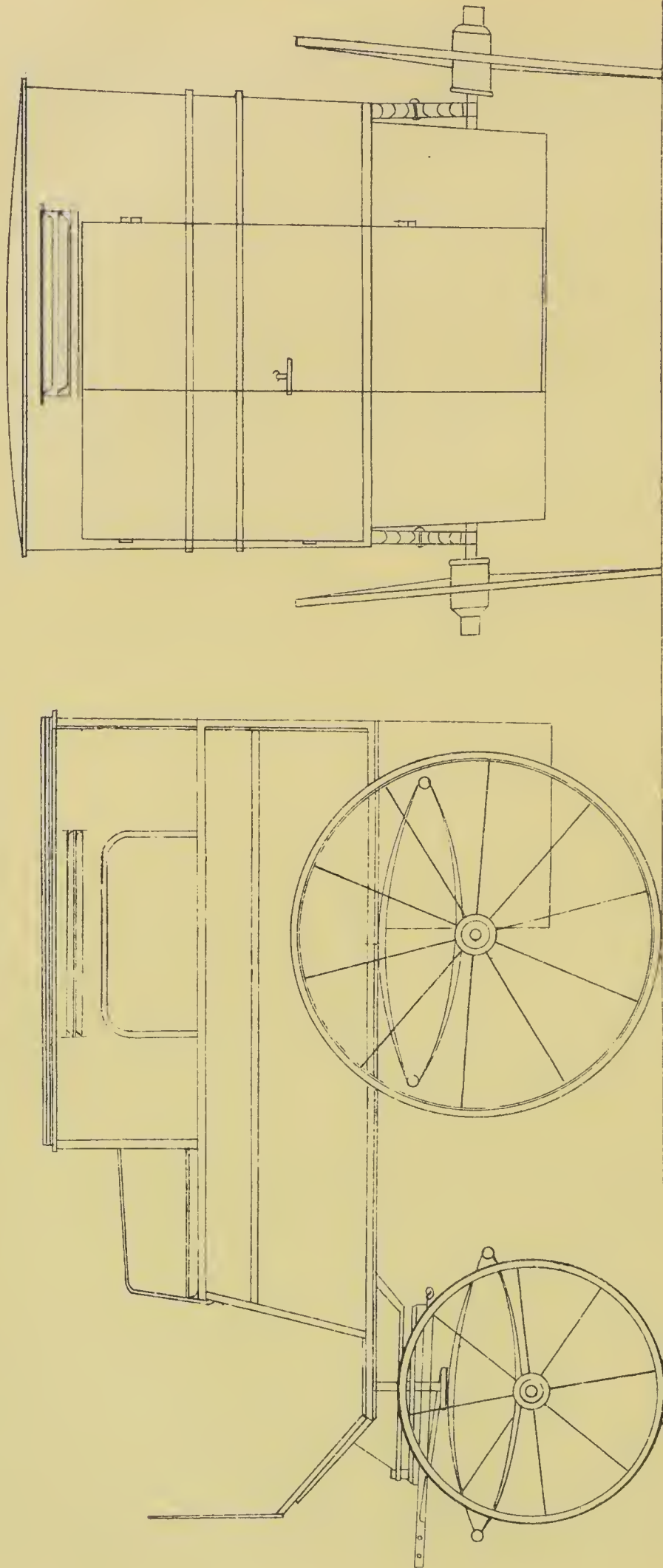
In addition to the articles disinfected a large number are annually destroyed and replaced by the Sanitary Authority. Thus in 1879 as many as 94 articles, including 40 straw mattresses and 10 beds, were so destroyed.

Ambulance.

The ambulance provided at this hospital was specially constructed by Messrs. H. Angus & Co., coachbuilders, of Newcastle, under the directions of Mr. Armstrong. Externally it has much the appearance of a light private omnibus. It weighs about 7½ cwt., and its length, exclusive of shafts, is 8 feet. To facilitate turning in narrow thoroughfares the front wheels are made to turn under the body of the carriage. The driver's seat affords space for three persons, including the driver. The entrance is by doors at the back. The left side is occupied by a movable stretcher, which can be carried to and from the patient's bedside. The stretcher is 6 ft. 2 inches in length and 18 inches in width at the head; the foot is narrower, and when in position this part slides under the driver's seat. On the right-hand side is a seat with a movable back, which can be either occupied by a patient or by two friends or attendants. Entrance to the carriage is easy, for at the back the bottom is only one foot from the ground. The conveyance is lighted by a window at each side, and ventilators are provided above the windows and the door. Inside, the ambulance consists throughout of varnished wood, so as to admit







*Ambulance in use at the Hospital for Infectious Diseases at  
Newcastle-upon-Tyne.*

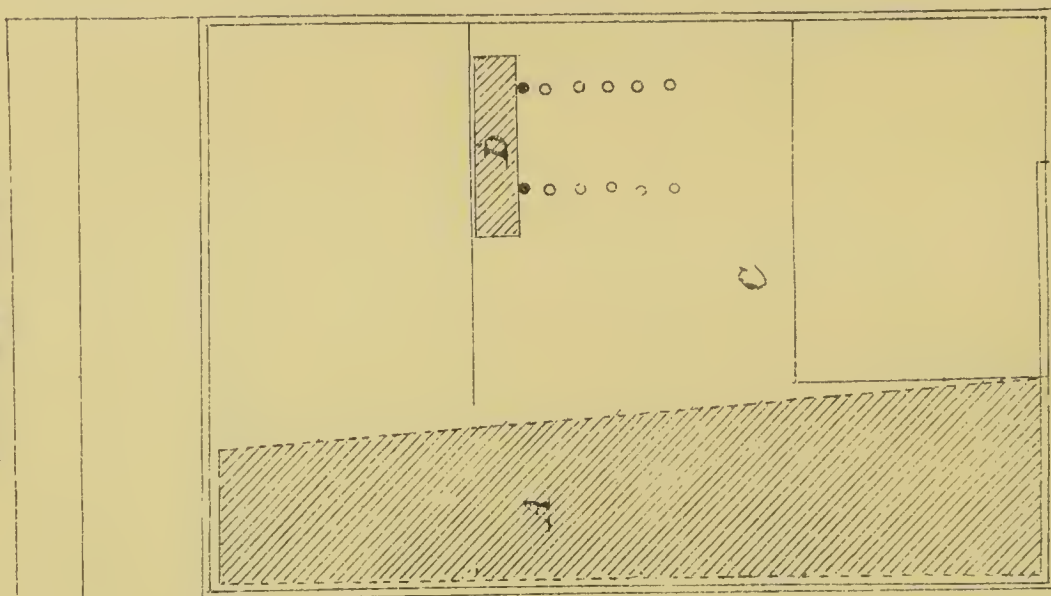
*Henry Angus  
Coach Works  
Newcastle.*



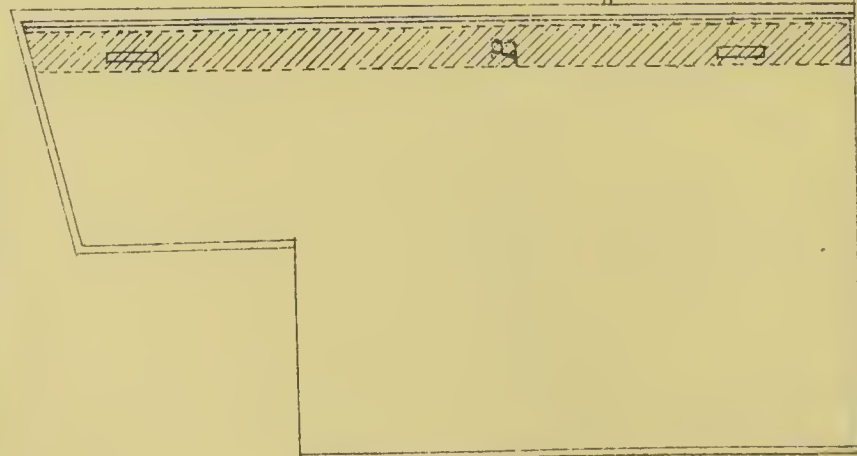


- A. Position of Moveable Stretcher when inside.  
 B. Side view of Moveable Stretcher.  
 C. Seats for Attendants.  
 D. Back board with holes for fixing at various angles.  
 E. Side view of back; dotted line showing angles at which it can be fixed.

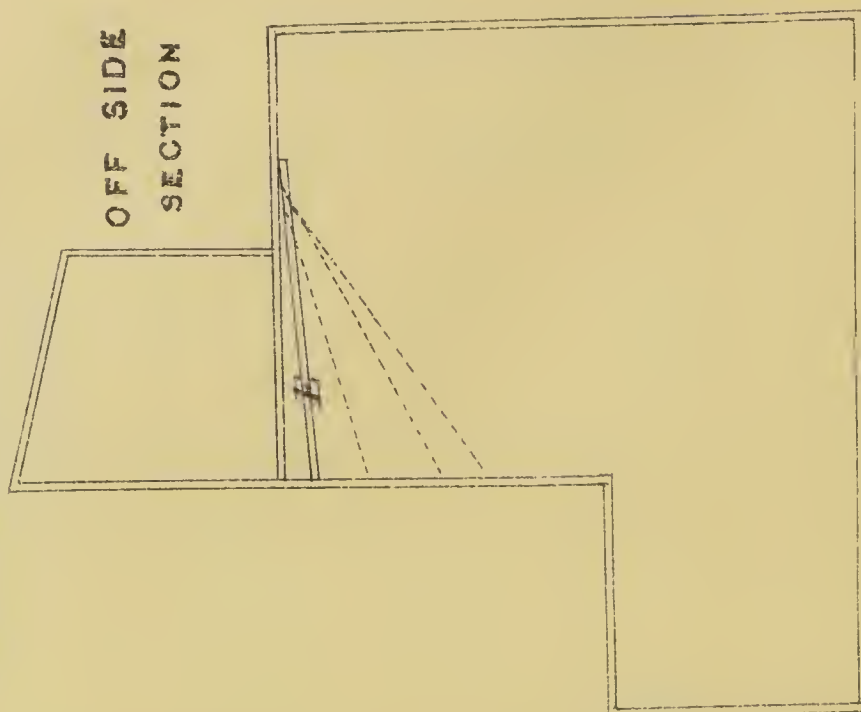
BOTTOM PLAN



NEAR SIDE SECTION



OFF SIDE SECTION



*Sections of Ambulance in use at the Hospital for Infectious Diseases at  
 Newcastle - upon - Tyne.*

*Henry Angus  
 Coach Works  
 Newcastle.*



of it being thoroughly washed and disinfected after each use. The cost was 65 guineas. Infected articles are also brought to the disinfecting stove in the ambulance, the purified articles being returned in another vehicle belonging to the Corporation. (See Plates, Nos. XXV., XXVI.)

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Influence of the hospital on the surrounding neighbourhood.

The position which this hospital occupies calls for some detailed notice. Standing on a restricted area of less than three-quarters of an acre, in a central and thickly populated portion of the borough, it has on two sides an open space used partly as a bowling green and partly for other purposes. On the other two sides the premises are bounded by public thoroughfares, one of which contains but few houses; the other, however, is thickly inhabited by persons mostly belonging to the poorest classes. This latter street is called Stowell Street, it has a northerly direction, and a considerable number of the houses on the west side of it have the walls of their small back-yards only separated from the hospital premises by a narrow thoroughfare and an old town wall, which together measuring 17 feet in width: the distance between the houses and 1<sup>o</sup>, the main hospital building; 2<sup>o</sup>, the wooden hospital; and 3<sup>o</sup>, the dead-house, being respectively 109 feet, 50 feet, and 34 feet. The houses on the eastern side of the street are 70 feet further from all these buildings. Stowell Street is eminently a street favourable to the spread of infectious fevers. Apart from the large number of persons residing in it, it contains a very considerable number of children, who make a playground of the streets adjoining, and so mingle together freely; indeed out of a total population of 632 persons, 233 are children under 14 years of age. The street also contains in close and dangerous proximity to the houses and windows, midden-privies of the sort most calculated to ensure the spread of diseases such as enteric fever. (These structures were in course of removal at the date of my visit.)

Owing to the information given by the staff connected with the Newcastle Dispensary, and to the regular returns of death which are received by the Medical Officer of Health, the amount of infectious disease prevailing in the borough can, to a very great extent, be ascertained, and during the past few years Mr. Armstrong has annually prepared a chart showing the number of cases of certain infectious diseases which in some way or other came under his notice, and in the annexed table I have shown the incidence of the cases of scarlet fever, of enteric fever, and of typhus fever reported in the whole borough and in Stowell Street.

	1876.			1877.			1878.			1879.		
	Scarlet fever.	Enteric fever.	Typhus fever.	Scarlet fever.	Enteric fever.	Typhus fever.	Scarlet fever.	Enteric fever.	Typhus fever.	Scarlet fever.	Enteric fever.	Typhus fever.
Cases in the borough	126	79	38	178	33	21	311	88	27	570	66	19
Cases in the hospital	9	20	22	11	21	8	14	26	13	8	11	15
Cases in Stowell Street ... ..	1	1	0	0	0	0	8	0	0	12	0	0

Judging from the charts, which are stated to be prepared with the greatest possible precision, and which have been revised for the purposes of this report, it appears that seven out of the eight cases of scarlet fever which occurred in Stowell Street in 1878 occurred at the extreme north-east end of the street, and all over 400 feet from the hospital premises; only one case occurring in that half of the street

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nearest to the hospital. And further, this single case took place, when for a period of nine weeks the hospital had only contained one patient suffering from scarlet fever. The remaining seven cases were confined to two out of a total of 52 houses in the street. Of the 12 cases of this disease which came under notice in Stowell Street in 1879, seven occurred in four houses situated in that half of the street most distant from the hospital, and the remainder in two houses in the nearer half of the street. The first of these two houses was attacked whilst only one case of scarlet fever was in the hospital, and the other at a time when no scarlet-fever patient had been under treatment for a period of five weeks. The number of scarlet-fever patients admitted into the hospital was 14 in 1878, and 8 in 1879; not more than five patients being under treatment there at the same time. The disease was during both of these years widely epidemic throughout the borough.

Quite apart, however, from the comparative immunity from infectious diseases experienced amongst the inhabitants in Stowell Street, it must further be stated that within 45 feet of the hospital premises is an infant school having an average attendance somewhat exceeding 100 children, who vary in age from three years to seven years. The present mistress has been there three years, and she informed me that, though she could not state that none of the pupils have had any infectious fever during that period yet, after consideration, she was unable to recall any "absences" except from measles. Within about 100 feet of the hospital is situated another school having an average attendance of 150 children whose ages are from four years to fourteen years. The present head mistress had, at the date of my visit, been at the school for four years, and she informed me that although there had been isolated absentees from scarlet fever when that disease was epidemic in 1878-79, yet they were very rare. In the latter nine months of 1879 there had been two such instances, and in one of them it was within her personal knowledge that the disease had been imported into the home of the pupil from elsewhere. This testimony, when viewed in connexion with the circumstance that as many as 284 fatal cases from scarlet fever, probably representing some 2,840 cases, occurred in the borough in 1879, is very striking.

One dwelling-house actually adjoins the hospital premises, being only separated from the ambulance shed by the party wall. The present occupants of this house have not been there long, but I am assured that no case of infectious fever is remembered to have prevailed there.

#### NORWICH URBAN SANITARY DISTRICT.

Population in 1881, 87,843. Rateable value, 260,000*l*.

The hospital for infectious diseases belonging to the Corporation of Norwich is an iron building which, having previously served as a small-pox hospital in a London suburb, was, owing to the prevalence of the same disease in Norwich, presented to the city by the Marchioness of Lothian and other ladies. It was ready for occupation early in 1872, and during that year it received some 60 or 70 small-pox patients.

The hospital occupies an isolated and elevated site of about one acre of land lying within, but near to the north-western boundary of the city, and about two miles from its centre. The site is separated from the main road by the Jewish Cemetery; almost immediately to the east of it lies the General Cemetery; at a distance of 100 yards to the west, but on the other side of the road is the Norwich Workhouse. The surface soil is gravelly, and it overlies chalk.

Small-pox  
leading to  
hospital  
provision.

Site and soil.



The hospital buildings consist of 1<sup>o</sup>, a ward pavilion, communicating by means of an enclosed passage, having doors in its opposite side walls, with 2<sup>o</sup>, an administrative block containing a kitchen, scullery, and pantry; and 3<sup>o</sup>, of outbuildings containing a wash-house, mortuary, and a chamber in which clothes, &c. are “fumigated;” this being the only means of disinfection available.

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Infectious  
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Hospital  
buildings.

The ward-pavilion is throughout constructed of corrugated iron lined with stained deal; the walls and roof being about 4 inches in thickness. It is divided into two halves by a central wooden partition reaching to the sloping roof. On one side of this partition are 1<sup>o</sup>, a ward having a floor-space of 23 feet × 22 feet, and a height of 12 feet to the wall-plate and of 20 feet to the pitch of the roof; 2<sup>o</sup>, a smaller ward opening out of the previous one and having a floor-space of 23 feet × 13 feet, and being of the same height as the larger ward; 3<sup>o</sup>, a separate room approached either from the smaller ward or from without, and intended for nurses. On the other side of the partition are two wards of the same dimensions as those already described; and opening out from the smaller ward there are two small bedrooms and a dispensary. A dwelling-room for the care-taker and his wife is also built on to this end of the pavilion, its only approach being from without.

The wards are all provided with windows in both opposite side walls. These windows face north and south respectively; they consist of two sashes, of which only the upper one, which is pivot hung, can open, and the bottom of the windows is as high as 5 feet from the floor, an arrangement which gives the wards a somewhat gloomy appearance. The two larger wards have doors leading into the enclosed passage, and opening directly into each of them is an earth-closet, which is not even provided with a window. The wards are warmed by means of stoves. The hospital was not fully furnished at the date of my visit, but a case of small-pox and one of scarlet fever occupied the two larger wards respectively, the former patient being attended by a relative, the latter by the care-taker's wife.

A leather-lined cab serves as an ambulance.

The water-supply is from a well “dry-steined,” and sunk to a depth of 80 feet into the chalk, and the slop-drainage passes with the rain water into a tank some 58 feet distant from the well. The exact nature of this tank could not be learnt.

Water-supply  
and drainage.

Between 1872 and 1876 only occasional cases of small-pox appear to have been admitted into this hospital, but from the latter date to the end of 1880, the admissions, together with the total deaths registered in the borough from certain causes specified, were as under:—

Admission of  
patients.

Date.	Small-pox.		Scarlet Fever.		"Fever."	
	Deaths Regis- tered.	Admis- sions to Hospital.	Deaths regis- tered.	Admis- sions to Hospital.	Dea <sup>hs</sup> Regis- tered.	Admis- sions to Hospital
1876 ... ..	2	0	59	1	23	3
1877 ... ..	0	2	78	7	39	0
1878 ... ..	2	4	10	6	23	0
1879 ... ..	0	2	32	6	27	1
1880 ... ..	0	0	187	9	37	0
4 years 1876-80 ... ..	4	8	366	29	149	4

## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Failure to  
secure isolation.

Compulsory  
notification of  
infectious  
diseases.

Since the specific infectious fevers are not admitted into the Norfolk and Norwich Hospital, and since the infectious wards at the workhouse had, up to the end of 1880, been used for the treatment of other cases than those fevers, the above table indicates the total isolation in hospital carried out in the urban sanitary district of Norwich, and it is evident that apart from the occasional admission of such small-pox patients as have come under notice, the isolation effected has been so partial and trivial as not materially to have influenced the spread of infection throughout the borough.

This result is the more remarkable because under section 43 of the Norwich Improvement Act, 1879 (appended to Report), the Corporation acquired powers rendering compulsory the notification of certain specified infectious diseases occurring within their district, and that under that section as many as 669 cases of scarlet fever, 180 of "fever," and 9 of diphtheria were brought under their notice in 1880.

The more prominent of the grounds which appear to have led to this failure to stay the spread of infection by means of isolation, are as follows:—In the first place, the hospital building is not properly adapted to the simultaneous isolation of cases of more than one disease, there is no proper accommodation for nurses, and it is structurally unfit for the reception of the sick in very cold weather. In the second place, it is locally known as the "Small-pox Hospital," and this has unquestionably acted as a deterrent to its use for other diseases. Thirdly, it is very generally believed by the medical profession of Norwich that the present care-taker and his wife are not suitable persons to have charge of the sick. In a report addressed to the Sanitary Authority in June 1880, Mr. T. W. Crosse, F.R.C.S., the City Medical Officer of Health, speaking of the hospital says:—"At the present time, and under the present administration, there can be no doubt that the place is not doing the good that it ought, and that it is certainly capable of doing, and the sooner it is restored to the condition of efficiency it once enjoyed, the better will it be for the city." And writing again at the end of 1880, Mr. Crosse refers to "the dislike which exists both on the part of the public and of the medical men to avail themselves of the accommodation offered them by the Sanitary Authority at the Iron Hospital," and he proceeds to say:—"The unpopularity that it enjoys, as far as I have been able to ascertain, is partly owing to the insufficiency of accommodation that it possesses, and partly to the want of proper superintendence and good nursing."

As the result of these circumstances medical men who, I am informed, would gladly send cases of infectious fevers into a properly constructed and properly administered hospital, now decline to take any such course, and it is possible that the Sanitary Authority themselves recognise some of the hindrances to isolation attendant on the existing arrangements, as they have never yet taken any action with a view to compelling the removal of a single patient to the building.

The general administration of the hospital is in the hands of Mr. T. W. Crosse, and patients can, at their own cost, be attended by any medical practitioner whom they select. The care-taker and his wife are the only residents, they receive 21s. a week, with fuel and lights, and they provide their own board, both when the hospital is empty and when patients are under treatment.

Patients or their friends who are able to pay are required to sign an agreement to that effect before entering, the charge made varying from 2s. 6d. to 10s. 6d. a week for attendance, &c., in addition to the actual cost of maintenance.

General and  
medical  
administra-  
tion.

Payments by  
patients.



Although the hospital is not intended for the reception of paupers, a few have been sent in by the Guardians on payment of 6s. 6d. a week. In no instance has any action been found necessary under the Public Health Act, 1875, to recover the cost of maintenance, &c.

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Cost of con-  
struction.

The site on which the hospital stands belongs to the Corporation, but a sum of 27*l.* 8*s.* was paid to a tenant as compensation for the crops growing at the time the hospital was put up. The removal of the building from London to Norwich, and its erection, cost 47*l.* 13*s.* 3*d.* and the furniture and fittings amounted to a further sum of 97*l.* 12*s.* The cost involved in the provision of water supply and drainage, and in the construction of a roadway to the buildings, &c., was not procurable at the date of my visit.

The total cost incurred by the Sanitary Authority in the maintenance of the buildings and patients during the year ending 24th of March 1880, was 93*l.* 6*s.* 8*d.*, but as some of the patients paid for their provisions and medical attendance independently of the Sanitary Authority, that amount does not represent the total cost. During the same year a sum of 7*l.* 6*s.* 5*d.* was refunded to the Sanitary Authority by patients or their friends.

Cost of main-  
tenance.

#### THE NORWICH IMPROVEMENT ACT, 1877.

Section 43.—In order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation in the city who is suffering from small-pox, cholera, typhus, typhoid, scarlet fever, diphtheria, or relapsing fever, or any other infectious disease which the Corporation may from time to time, with the sanction of the Local Government Board, by resolution of the Council specify, the following provisions shall have effect; (that is to say,)

Notice to be  
given of  
persons suffer-  
ing from cer-  
tain diseases.

- (1.) If any such inmate be suffering from any such disease as aforesaid and no medical practitioner is attending on or has been called in to visit such inmate, the occupier or person having the management or control of such building, or if such occupier or person is prevented by reason of such disease, the person in charge of such inmate shall, so soon as he shall become aware of the existence in any such inmate of any such disease, forthwith give notice to the Corporation at the Guildhall of the existence in such inmate of such disease.
- (2.) If such inmate be not a member of the family of such occupier or person, the head of the family (resident in such building) to which such inmate belongs, or if there be no such head then such inmate (unless prevented by reason of such disease or of youth) shall, on becoming aware of the existence in such inmate or in his own person, as the case may be, of such disease, forthwith give notice thereof to such occupier or person.
- (3.) The Corporation shall provide and supply gratuitously to every registered medical practitioner resident or practising in the city forms for the certificate by such medical practitioner of the particulars herein-after mentioned in relation to such cases according to the form set forth in the Second Schedule to this Act.
- (4.) Every medical practitioner attending on or called in to visit such inmate shall, on becoming aware that such inmate is suffering from any such disease as aforesaid, forthwith fill up, sign, and deliver to the occupier or person having the management or control of the building, or, in case such person is suffering from such disease, to the person in charge of such inmate a certificate stating according to the forms prescribed and supplied to him by the Corporation the name of such inmate, the situation of such building, and the name of such occupier or person, and the nature of the disease from which such inmate is suffering.
- (5.) The person to whom such certificate shall be given by the medical practitioner shall forthwith deliver the same or cause the same to be delivered at the Guildhall to a clerk or servant of the Corporation in attendance there.

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(6.) The Corporation shall pay to every medical practitioner who shall, in pursuance of this section duly give any such certificate as aforesaid a fee of two shillings and sixpence in respect of the same: Provided that more than three fees shall not become payable under this section within an interval of thirty days to the same medical practitioner for certificates given by him in respect of the same disease occurring in the same building.

And any person who shall offend against this enactment (unless ignorant thereof, the burden of the proof of which shall be on him,) shall for every such offence be liable to a penalty not exceeding five pounds.

## NOTTINGHAM URBAN SANITARY DISTRICT.

Population in 1881, 186,656. Rateable value, 695,000*l*.

Small-pox  
epidemic  
leading to  
hospital  
provision.

In the autumn of 1871 small-pox became epidemic in Nottingham, and apart from a two-storied detached wing, containing 20 beds, at the Nottingham General Hospital, there were no means in the borough for the isolation of cases of infectious diseases. In view of the emergency the Corporation acquired from the Guardians of the Nottingham Union the temporary use of a new wing which had just been completed in connection with the workhouse buildings, on condition, amongst other things, that pauper patients should be admitted into it as well as others. By the end of December as many as 123 cases of small-pox had been received into this building, but the measures of isolation had been resorted to too late to stay a very general spread of the epidemic. Under these circumstances the Corporation determined, towards the close of the year, to erect several wooden pavilions on a piece of land situated at the back of the workhouse, and used hitherto as a workhouse garden. By the end of February 1872, as many as 542 cases had been removed to hospital, 234 being received into the workhouse wing, 244 into the wooden pavilions, and 64 into the detached wing at the general hospital. From this date the epidemic began to subside, and the 191 fresh cases which were removed to hospital between February and July, when the outbreak ceased, were all treated in the pavilions. The total number of cases isolated was 733.

These hurriedly erected wooden pavilions, together with certain additional buildings, some of brick and some of wood, have, after certain alterations and improvements, constituted the hospital for infectious diseases for the borough of Nottingham since 1871. They are locally known as the Garden Hospital.

Site and soil

The site consists of some five acres of land belonging to the Corporation. It was however in 1871, and still is, sublet to the Guardians as garden ground for paupers; the workhouse itself being separated from it by a broad thoroughfare. It occupies a fairly elevated position on the slope of the broad hill on which a large portion of Nottingham stands, and it is both central and easily accessible from all portions of the urban district. It is enclosed on all four sides by a wooden fence somewhat over 6 feet high. The soil is new red sandstone.

Hospital  
buildings.

The buildings themselves, with one exception, call for no detailed description. They consist of four large and four small wooden huts or pavilions, built on brick foundations, and capable of receiving some 80 patients; there are also certain outbuildings, including administrative offices, a mortuary, an ambulance shed containing an old cab stripped of its linings, an entrance lodge, and a "disinfecting station," to which separate reference will be made. The buildings are mostly very unattractive in appearance, the woodwork being coated outside with tar, and even in one of the best huts the windows are so high up that no view whatever can be obtained from them. The walls of the wards



consist of two layers of wood some 6 inches apart, the space being filled in with sawdust, and during the severe winter of 1880-1 it was found impossible, even by keeping up large fires day and night, to maintain the buildings in use at a proper temperature; indeed, in one of the wards the temperature near one of the beds was found to have fallen below 32° Fahr., thus rendering it unsafe for the reception of patients.

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After the cessation of the small-pox epidemic in 1872, the Garden Hospital remained closed until scarlet fever became prevalent in 1874-75. Some cases of typhus were also removed to it in 1875, and cases both of scarlet fever and of other infectious diseases were under treatment there at frequent intervals during 1876 and 1877. Towards the end of 1877 the area of the borough of Nottingham was enlarged, and since that date the number of cases admitted has been as follows:—

Admission of patients (a) to the Garden Hospital.

Date.	Small-pox.	Scarlet Fever.	Diphtheria.	"Fever."	Measles.	Whooping Cough.	Other Diseases.
1878 ... ..	2	35	0	5	16	3	1
1879 ... ..	2	60	0	2	6	8	1
1880 ... ..	5	32	1	0	12	13	0
Three years } 1878-80 .. }	9	127	1	7	34	24	2

The detached "fever" wing in the grounds of the Nottingham General Hospital, and into which no infectious disease except "fever" is now admitted, constitutes, however, a part of the provision available for the isolation of infectious diseases occurring in the borough, and during the three years 1878, 1879, and 1880, 18, 11, and 15 cases of "fever" respectively were admitted into it from the urban district. In the following table these cases are added to those treated in the Garden hospital, and the total amount of isolation effected amongst the principal infectious diseases which have been removed to hospital is compared with the total deaths registered in the borough from those diseases:—

(b) to the General Hospital.

Total isolation for the borough.

Date.	Small-pox.		Scarlet Fever.		"Fever."		Measles.	
	Deaths registered in Borough.	Cases removed to Hospital.	Deaths registered in Borough.	Cases removed to Hospital.	Deaths registered in Borough.	Cases removed to Hospital.	Deaths registered in Borough.	Cases removed to Hospital.
1878 ... ..	0	2	76	35	55	23	46	16
1879 ... ..	1	2	181	60	37	13	73	6
1880 ... ..	0	5	134	32	58	15	265	12
1878-80 ...	1	9	391	127	150	51	384	34

It will thus be seen that apart from small-pox the amount of isolation effected, when compared with the deaths registered in the borough, is

APP. NO. 1.	but small. To some extent this is accounted for by the temporary
On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.	character of the hospital buildings, and it must also be in part attributed to the obvious poor-law character which, more or less, at all times, attaches to the establishment. All pauper cases of infectious disease occurring in the borough are admitted, and proper measures are not adopted to prevent this class from being distinguished from those occupying a better social position. Thus paupers, unlike the other patients, are attended by the poor-law medical officer, in-door paupers are admitted in pauper uniform, and adult paupers are, in addition, engaged in garden work on the hospital premises; circumstances which have led to complaints both by non-pauper patients and their friends.
Admission of paupers.	
Social status of patients.	No accurate record of the social status of the patients have been kept, but by far the majority are persons of the artisan class sent in from a dispensary to which no one can be admitted who is able at the time to afford private medical attendance; next in order come domestic servants and inmates of public institutions. A few have also been admitted from tradesmen's houses, from schools, and from gentlemen's families.
Compulsory notification of infectious diseases.	In 1878 the Corporation procured powers under a special Act for the compulsory notification of infectious diseases, but as they have hitherto failed to put those powers into operation the advantage which would otherwise have resulted from the immediate isolation of first attacks of such diseases have not been secured.
Results of early isolation.	Notwithstanding these obvious disadvantages however, the value of the hospital on several occasions in completely checking the spread of small-pox and typhus, and in limiting the spread of scarlet fever, are highly spoken of by Dr. Seaton, Medical Officer of Health for the borough. As regards the latter disease, Dr. Seaton reports in 1879 that 37 out of the 60 cases removed to hospital were first attacks in "households containing many susceptible children, and the effect of "early isolation, combined with disinfection, may be judged of from "the fact that only in one instance did a second case occur, and this "was under circumstances which made it extremely probable that the "infection was taken from some other source."* Results of a very similar character were obtained in 1880; indeed the only case in which early isolation of an undoubted first attack of scarlet fever was effected and any spread of infection followed, was in an instance in which the patient's isolation was, for special reasons, not maintained sufficiently long, and a second attack followed within three days of his return home.
Admission of young children.	No great difficulty has been met with in securing the admission of young children. Thus, out of a total of 204 patients admitted in the three years 1878-80, 135 have varied in age from a few months to 10 years, and 71 were under five years of age.
Administration, medical attendance.	The general and medical administration of the hospital is in the hands of Dr. Seaton, and the permanent staff consists of a head and an assistant nurse, who respectively receive 50 <i>l.</i> and 40 <i>l.</i> a year, together with their board, and of part of the services of an officer engaged also as superintendent of the "disinfecting station." The medical attendance is carried out by the medical officers of the dispensary in the case of patients sent in from that institution, by the poor-law medical officer in the case of paupers and in other cases by private medical practitioners selected and remunerated by the patients themselves. All medicines prescribed are dispensed by a chemist near at hand, at the cost of the Corporation. The plan of allowing patients, even from amongst the poorer classes, to make their own arrangements as to medical attendance

\* Annual Summary for 1879, by Edward Seaton, M.D., Medical Officer of Health.



is stated to have answered well, and it is believed to have secured the isolation of some cases which otherwise would have been treated at home under circumstances which must have tended to the spread of infection.

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In no case have any steps been taken, since the passing of the Public Health Act, 1875, for the compulsory removal of a patient to the hospital; the only instance in which any such measures were found necessary having occurred during the small-pox epidemic of 1871-72, when a magistrate's order was procured for the removal of several cases of that disease from an overcrowded dwelling.

Public Health Act, 1875, s. 124.

As a rule, patients are expected to contribute something towards their maintenance whilst in the hospital, and when they can obviously afford to do so a guarantee for the amount is filled in before admission, but both the Medical Officer of Health and the Inspector of Nuisances have power to promise the remission of the fees in the case of the really poor. The sum charged under any circumstances is only 10s. a week, and in some instances it is reduced to 2s. 6d. and even 1s. a week. The Guardians pay the former sum for all pauper cases sent in. No action has been taken to recover any of these sums under section 132 of the Public Health Act.

Repayment by patients.

No person is allowed to enter the wards except on an order of the Medical Officer of Health, and this is only granted in cases of dangerous illness. Visitors can, however, at all times have information as to the welfare of patients by inquiring at the lodge.

Public Health Act, 1875, s. 132.

Visitors.

The cost of erecting the hospital buildings was as follows:—

Cost of construction.

	£	s.	d.
Erection of buildings - - - -	2,931	18	4
Furniture and fittings - - - -	708	9	7
Bedding, clothing, &c. - - - -	526	0	0
	<hr/>		
	£4,166	7	11
	<hr/>		

and the average annual expenditure during the past five years has been 820*l.* 13*s.* 10*d.* Of this a yearly average sum of 141*l.* 15*s.* 5*d.* has been repaid to the Corporation by the Guardians and others, thus reducing the net annual cost to 678*l.* 18*s.* 5*d.*

Cost of maintenance.

The position occupied both by the Garden Hospital and by the wing at the workhouse, where small-pox cases were under treatment in 1871-72, calls for further comment. The Garden Hospital site, some five acres in extent, is in a populous part of the borough, it is surrounded on two sides by fairly wide thoroughfares, and some houses and factories abut on it on the other two sides. The Nottingham workhouse occupies a somewhat extensive area lying between one of the thoroughfares bounding the Garden Hospital, and a somewhat narrow thoroughfare called York Street. Since Dr. Seaton's appointment, in 1872, it is certain that no circumstances have ever arisen leading to the supposition, or even to a suggestion, that infection had spread from the Garden Hospital to the surrounding neighbourhood. Dr. Seaton was not in office during the small-pox epidemic in 1871-2, but with his co-operation I have sought for any information procurable as to the influence of the Garden Hospital and of the temporary small-pox hospital in the workhouse wing during that period, application for this purpose having been made to medical practitioners then residing in the immediate neighbourhood of the two hospitals, to former workhouse medical officers, to owners of adjoining factories, and to Mr. Wm. Richards, an experienced borough officer who at the date of the epidemic

Influence of the hospitals on surrounding neighbourhood.

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was at the head of the Municipal Sanitary Department, and in that capacity devoted nearly the whole of his time to matters relating to the management of the hospitals and to the removal of patients.

As the result of these inquiries I learn that, not only was there no exceptional prevalence of small-pox in the vicinity of the two hospitals at that date, where, as will be remembered, as many as 669 cases were under isolation between the months of November 1871 and June 1872, but it is asserted by some informants whose statements are worthy of every consideration, that there was less small-pox in the vicinity of the hospitals than in other parts of the town containing similar populations. One medical practitioner writes:—"I am quite sure . . . that although living in the immediate neighbourhood, I had no greater proportion of cases of small-pox amongst my patients residing near the hospital than I had in other parts of the town, and not only so, but in by far the greater part of the cases the origin of the attack was easily traced to direct contagion, and never in a single case was the suggestion made that the near neighbourhood of the hospital had anything to do with it." Another, after examining his visiting lists for the period in question, states that although he was in the habit of attending patients in "from 70 to 80 houses in the immediate neighbourhood of the hospitals," he does not remember "to have had a case of small-pox amongst them." As regards the wing at the workhouse occupied by the small-pox patients, it should be added that it was in actual contact with another occupied portion of the workhouse buildings, the nearest windows of the two portions of the building in question being only 7 feet apart, and that the windows of the small-pox wards, which during a part of the period were admittedly much over crowded, were open on to York Street, being only 44 feet distant from the windows of the houses on the other side of the street. Owing to these circumstances some anxiety was felt during the course of the epidemic, and Mr. Richards was constantly on the look-out for any spread of infection which could own its origin to the vicinity of these small-pox wards. I am, however, unable to learn, either from him or from others that any case of the disease occurred either in the workhouse itself or in any of the York Street houses which faced the wards.

The extent to which measures of vaccination and re-vaccination contributed to these results I have found it impossible at this date to learn. Both the resident officers and the inmates of the workhouse were, however, vaccinated or re-vaccinated at the commencement of the epidemic, and in one factory immediately adjoining the Garden Hospital grounds all the employés were subjected to the same operation.

Disinfecting  
station, stove,  
&c.

The "disinfecting station" and stove belonging to the Nottingham Corporation call for special notice. They were both designed by Dr. W. H. Ransom, F.R.S., of Nottingham, and the stove was manufactured by Messrs. Goddard and Massey, engineers, also of that town.

In designing the stove Dr. Ransom was guided by the opinion that heat is an efficient disinfecting agent, and that for certain articles it is the only known trustworthy agent. In order to the efficient application of heat to the purposes of disinfection by means of any chamber heated by a furnace or otherwise, he was of opinion, as the result of prolonged experiments:—1°, that it should be possible to maintain in all parts of the chamber a high temperature, within certain known limits, and for such a period as to ensure adequate penetration of heat into the interior of bad conductors; 2°, that a current of heated air should constantly pass through the chamber so as to favour penetration of heat by drying; 3°, that the heat to be employed should be determined by the singeing



point of the articles to be dealt with; and 4°, that as regards heat the apparatus should be self-regulating.

A stove having been designed which fulfilled the objects held in view, experiments were made so as to ascertain the highest temperature to which various articles could be subjected for a period of several hours without injury, and as the result of them it was found that no such articles as are likely to need disinfection were damaged by repeated exposures of from four to eight hours duration at a temperature of 250° Fahr., but that when 260° Fahr. was much exceeded, risk of injury to certain articles resulted, woollen tissues as a rule suffering more than cotton ones. Experiments were also carried out in order to ascertain the circumstances under which the penetration of a high temperature into articles such as beds, pillows, &c. could be effected, and it became apparent that though such penetration was mainly dependent on the length of exposure, yet that it was influenced, amongst other things, both by the thickness of the articles dealt with, and by the amount of moisture they contained. An exposure of some eight hours to a temperature varying from a maximum of 255° Fahr. to a minimum of 245° Fahr. was as a rule required to secure a heat of 250° Fahr. in the centre of a bed or a pillow.

The apparatus, which was manufactured by Messrs. Goddard and Massey to secure the results which Dr. Ransom deemed necessary, and which has been styled "The Nottingham Self-Regulating Disinfecting Apparatus," was in 1872 erected at the General Hospital in Nottingham, and in 1876 a somewhat similar one, embodying certain improvements, was constructed for the Nottingham Corporation at their disinfecting station.

The latter apparatus consists of a cubical iron chamber measuring 6 feet by 5 feet and 5 feet high, and it is enclosed in a wooden casing with 5 inches of felt packing between the iron and the woodwork. At the side of and at a lower level than the chamber, is the "furnace," the heat of which is obtained by burning gas with smokeless flames by means of a large "atmospheric gas-ring burner." This burner is contained in a double-coated circular cast-iron tube, truncated at its base, and having at its sides cast-iron webs through which the air passes. The products of combustion mixed with the heated air passed by means of a horizontal flue to the floor of the chamber, which they enter through perforated iron-plates or "gratings." The size of the holes in these plates has been so calculated as to ensure the equal distribution of the heated air through all parts of the chamber, allowance being made for the expansion of the air and for friction. An outlet flue is fixed at the top of the chamber; it admits of the escape of the heated air, and is fitted with a damper so as to regulate the speed of the current through the chamber. A slide is also fixed in connexion with the perforated iron plates so that in cases where the outlet flue is carried into a shaft, the current of air entering the chamber can be so regulated as to prevent the admission of more air than can be heated by the gas burners to the required temperature. Fixed thermometers in the inlet and the outlet flues show the temperature of the entering and out-going currents, and they respectively indicate the maximum and the minimum temperatures of the air passing through the chamber. The entrance of the gas into the furnace is controlled by a "governor of gas pressure," and also by a self-acting mercurial regulator. The latter forms a special feature of the apparatus, for it is so designed that the gas entering the furnace is gradually shut off as the temperature of the chamber rises, and from experience Dr. Ransom has stated that the regulator having once been set at any given temperature, that heat can,

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in the absence of any supervision, be maintained for almost an indefinite period "without any greater diurnal variation than  $5^{\circ}$  Fahr., which is "usually due to the increase of pressure at the gasworks in the evening." Even this variation can, I am informed by Messrs. Goddard and Massey, be avoided by means of the "gas governor" as now constructed. Owing to this arrangement sufficient gas is always passing into the furnace to maintain the required temperature, but the consumption is strictly limited to that which is absolutely necessary to secure this result. Thus there is no waste of fuel.

Near the outlet flue is an arrangement designed for the automatic extinction of any fire which may result, as from the lighting of a lucifer match contained in the pockets of clothing. It consists of a chain, which by means of a weight fixed to it, keeps open a stop cock in the pipe through which the gas passes, and holds up both the outlet damper and also a larger damper above the furnace. This chain is provided with a fusible link which, melting at a temperature of  $300^{\circ}$  Fahr., secures the instantaneous closure of both dampers and also of the stop-cock, the latter thus shutting off all supply of gas. A signal bell so placed as to be heard by the person in charge of the stove is also rung by the same action.

The chamber itself is fitted with slides at the top and sides, for the purpose of fastening up beds, or of suspending, by the aid of cross-bars, such articles as blankets, sheets, &c. Baskets containing articles of clothing can also be hung up in it.

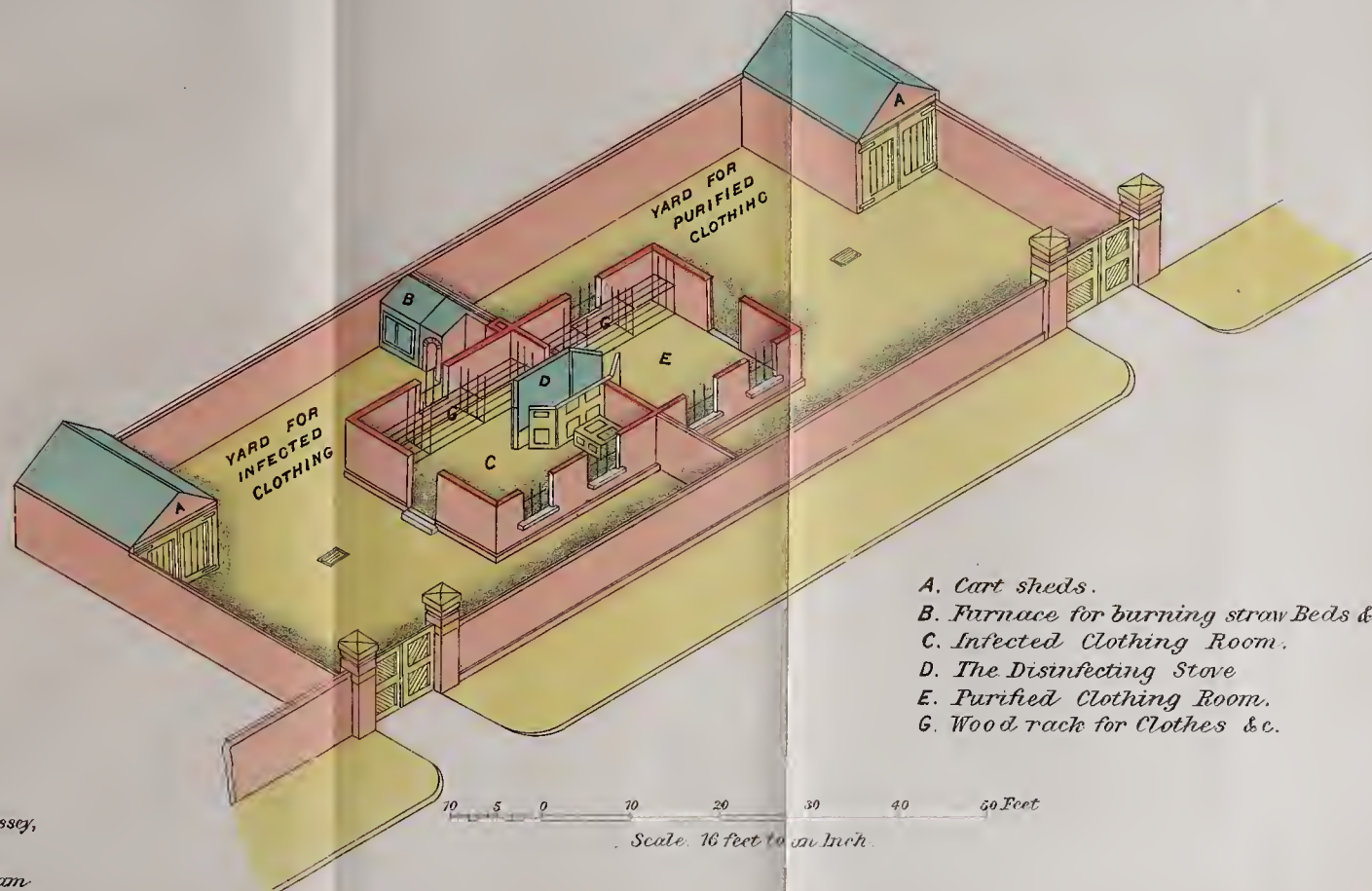
The "disinfecting station" belonging to the Nottingham Corporation is situated on the grounds of the Garden Hospital. It consists of a yard, measuring 100 feet by 40 feet, surrounded by a brick wall, and containing the stove-house, two sheds, and a furnace for the destruction of infected articles. The stove-house occupies the centre of this yard, which is divided into two distinct portions by means of a wall passing on either side from the stove-house to the boundary wall of the yard. Each division of the yard has a separate carriage entrance, and a shed containing a cart; one division and one cart being reserved for the reception of infected articles, the other division and cart for the removal of the purified articles. The furnace for burning articles not worth the process of stoving is situated in that portion of the yard reserved for infected things. (See Plate No. XXVII.)

The stove-house is a substantial brick building 14 feet long and 7 feet wide; it is well lighted and well ventilated, and is provided with an entrance door at either end. The building is divided into two equal parts by means of a partition wall reaching to the ceiling; the stove itself being fixed in this partition wall. Both the rooms thus formed are fitted with racks for the storage of bedding, clothing, &c., one room being reserved for infected articles, the other for articles which have been stoved. The stove itself is fitted with doors which open into both rooms, and which are so arranged that those leading to that side of the building appropriated to the cleansed articles cannot be opened until the others are closed. The infected articles are thus placed into the stove from one room, and removed from it into the other, the stove itself forming the only means of direct communication between the two divisions of the building. In the partition wall, however, is a small window fitted with a fixed sheet of glass. (See Plates Nos. XXVIII., XXIX.)

The stove belonging to the Corporation has now been in use since 1876, and from Dr. Seaton I learn that some 18,000 articles have been dealt with in it. At first the stove was heated to a temperature of  $250^{\circ}$  Fahr., the inlet thermometer marking  $255^{\circ}$  Fahr. and the outlet one  $245^{\circ}$  Fahr., but during recent years it has been the practice to work with



# BIRDS EYE VIEW OF THE DISINFECTING STATION. NOTTINGHAM.

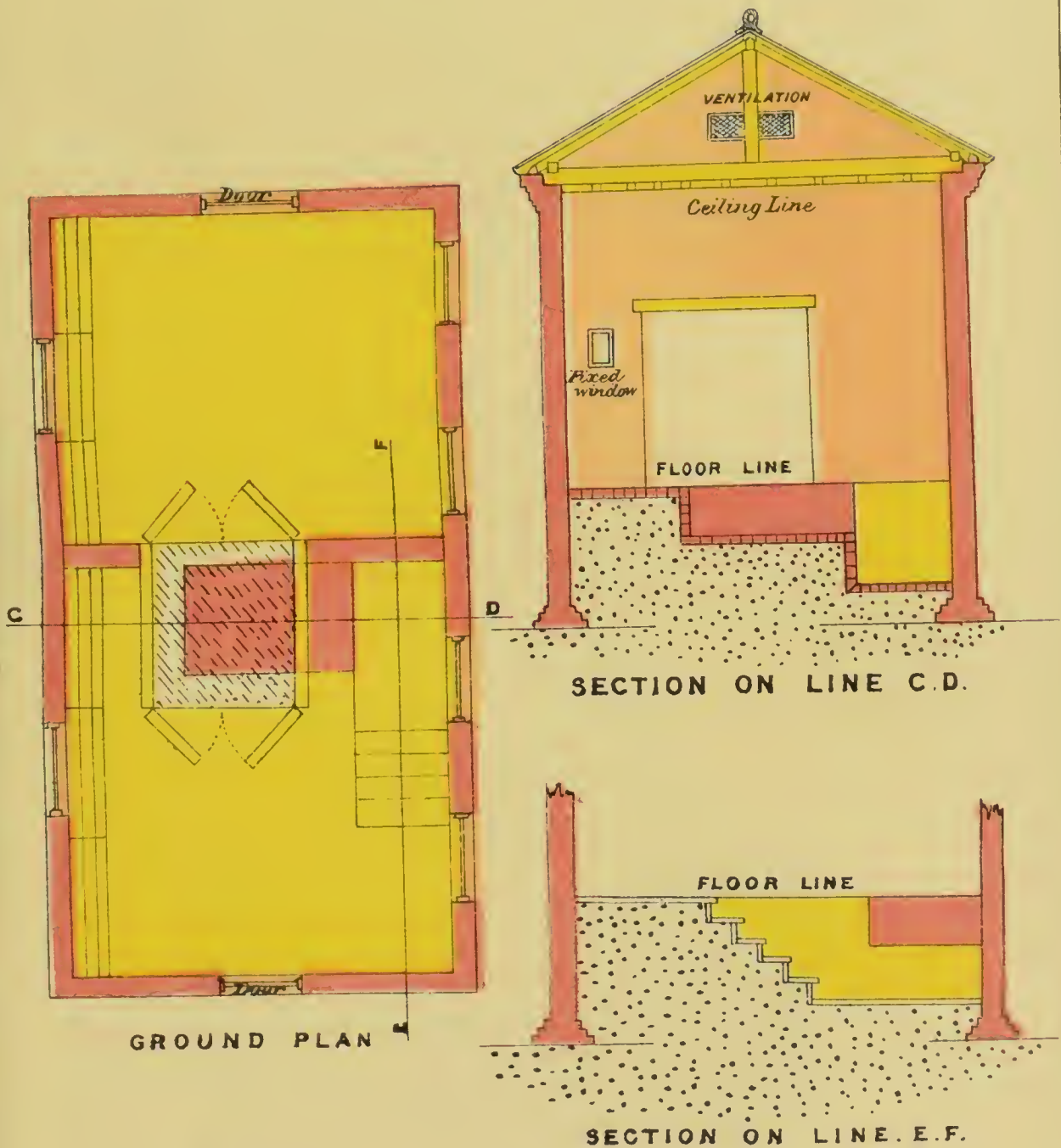


Goddard & Massey,  
Engineers  
Nottingham





# DISINFECTING STOVE NOTTINGHAM.



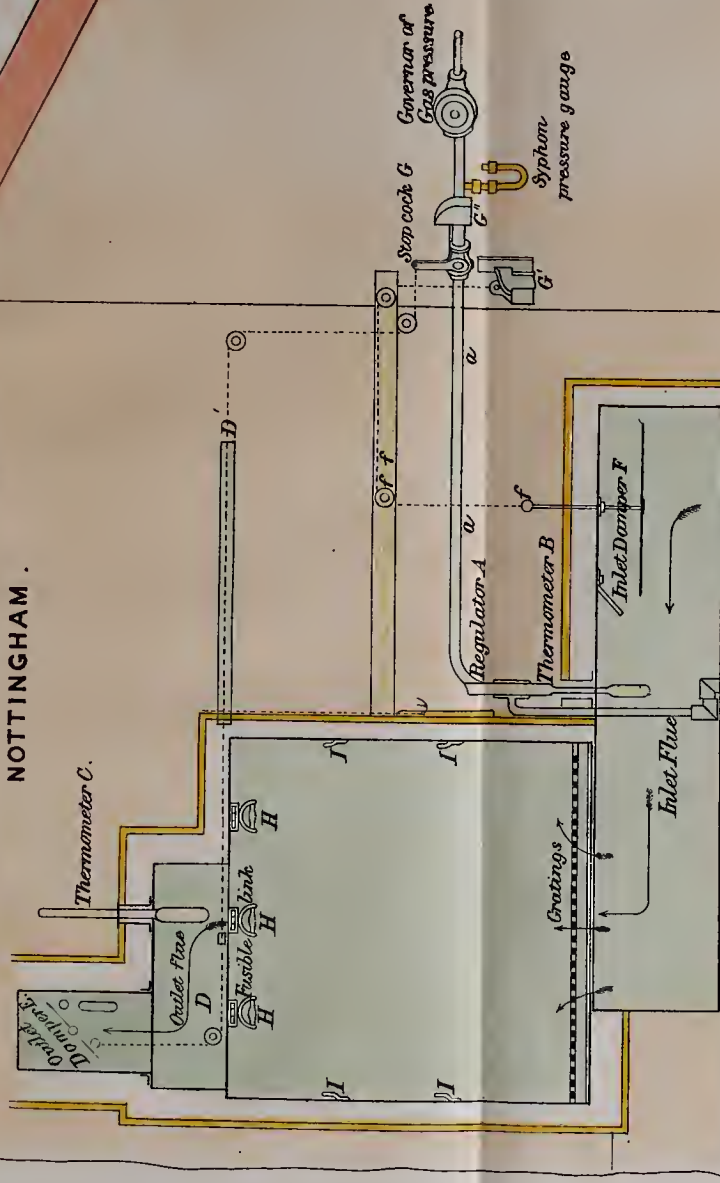
SCALE  $\frac{1}{4}$  INCH TO ONE FOOT.

*Goldard & Mussey, Engineers,  
Nottingham.*

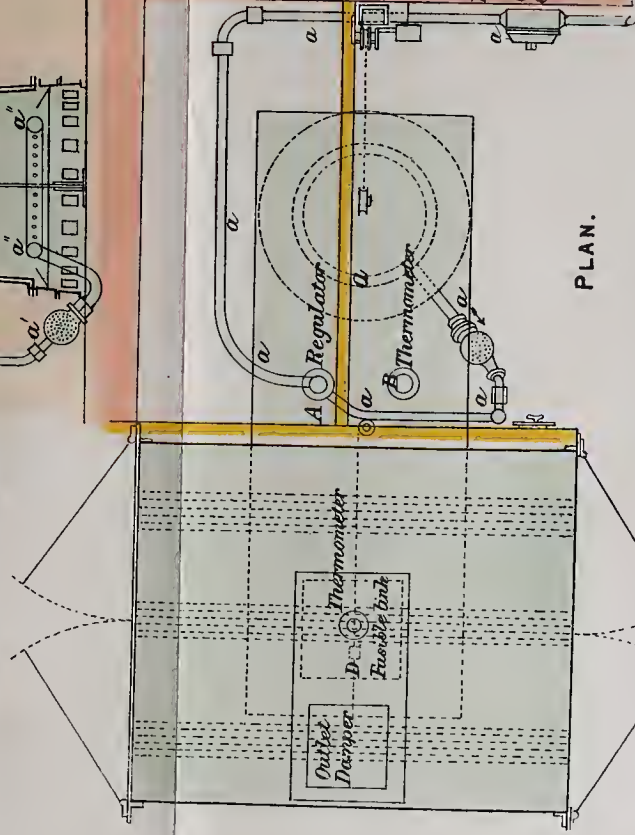




# SELF REGULATING DISINFECTING STOVE. NOTTINGHAM.



SECTIONAL ELEVATION



PLAN.

- A. Gas regulator
- a. Pipe conducting gas.
- a'. Burner burner
- B. Maximum Heat Thermometer.
- C. Minimum Heat Thermometer.
- D. Fusible Link.
- D'. Chain connected with fusible link D, 2nd Dampers E, F, and 3rd Stop cock G.
- G'. Weight released by thermometer G which falls when fusible link melts
- H. Draw out slides for separating beds &c.
- I. Fixed slides carrying cross bars.

Siphon pressure gauge  
Governor of Gas pressure

Goddard & Mussey, Engineers  
Nottingham





a temperature of from  $260^{\circ}$  to  $262^{\circ}$  Fahr. at the inlet, and of some  $6^{\circ}$  to  $8^{\circ}$  less at the outlet, the main object being thus to secure a somewhat more rapid penetration of such articles as beds and pillows. Writing as to this stove in 1877, Dr. Seaton said:—"In no instance has there been any damage to the articles," and "the injury caused by periodical stoving of bedding, &c. does not amount to more than may be called 'fair wear and tear.'" Since then, however, two accidents leading to the destruction of articles by burning have occurred, both due, it is believed, to lucifer matches being inadvertently left in clothing,\* and also to some structural defects which at the time prevented the closure of the dampers and the shutting off of the gas when the fusible link melted; defects which have since then been remedied both in this and in the other stoves manufactured by Messrs. Goddard and Massey. These accidents occurred more than two years ago, and the articles which since then have been submitted to the process of stoving include dresses of silk, satin, velvet, and grenadine; skirts of similar materials and of eiderdown; jackets and muff's of seal-skin and other furs; and also ladies' waterproof cloaks, jewellery, papers, books, &c. Dr. Seaton informs me, as the result of frequent personal examination of these articles, that although the articles are allowed to touch the iron sides of the chambers on all sides, yet there has been, with one single exception, no appreciable injury to any of them. The exception referred to was a white satin dress which was damaged by the melting of a trimming of imitation pearls which were found to have been largely composed of wax, and which should have been removed before the dress was stoved. In 1880 as many as 4,906 articles were dealt with in this stove; they included 220 mattresses, 204 beds, 351 bolsters and pillows, 224 blankets, 365 coats and vests, 168 pairs of trousers, 54 carpets, 43 quilts, and 700 books.

Repeated experiments made under Dr. Seaton's supervision have shown that when the stove has not been in recent use, it takes from  $6\frac{1}{2}$  to  $7\frac{1}{2}$  hours to raise the interior of the chamber to  $250^{\circ}$  Fahr., the longer period being required when a high wind prevails or when the amount of hygrometric moisture in the atmosphere is sufficient to make the wooden and felt casing damp. As a rule, however, seven hours suffice. The amount of gas requisite to raise the stove to this temperature is 455 feet, or at the rate of 65 feet per hour, and the price of gas in Nottingham being 2s. 6d. per 1,000 feet, the cost is 1s.  $1\frac{1}{2}$ d. When, however, the stove is in constant use a shorter period and a smaller consumption of gas suffice to heat the chamber to the required temperature.

The temperature of the interior of the chamber being  $250^{\circ}$  Fahr. it takes some  $7\frac{1}{2}$  to 8 hours, and a consumption of from 490 to 520 feet of gas, to secure penetration of that temperature into the centre of an ordinary flock pillow, and a somewhat shorter period if the chamber is heated, as it now always is, to a temperature of  $258^{\circ}$  Fahr. But as a matter of practice articles are left in from 8 to 10 hours, for the officer in charge of the stove having at night heated the chamber so that the inlet thermometer stands at about  $260^{\circ}$  Fahr., and having set the regulator so that this temperature shall be maintained, fills the chamber with the articles to be stoved, and, fully relying on the self-regulating action of the heating apparatus, leaves them in until the morning.

\* Since the occurrence of these accidents all pockets are turned inside out, and if they exhibit holes, the linings of the articles are examined to see if matches have slipped down into them, an occurrence which is found not to be uncommon in the case of overcoats and waistcoats.

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The original cost of erecting the disinfecting station, apart from the site which belongs to the Corporation, was 650*l*. This sum, however, includes about 150*l*. for numerous alterations which were subsequently ascertained to be necessary in connexion with the approaches, &c. It has also been found that the building in which the stove is placed is unnecessarily large on the side into which the articles which have been stoved are placed pending their removal, and that by decreasing its size expense may be saved in future buildings of the same kind.

The stove is in the charge of an officer who devotes half his time to certain administrative work at the Garden Hospital. This officer receives a salary of 104*l*., and he is assisted by a man receiving 20*l*. a year, and whose duties are limited to that portion of the "station" from which the purified articles are returned to their owners. Their joint salaries may therefore be taken as amounting to 72*l*. a year.

The total cost of maintaining the establishment during the year ending March 1881, when about 5,000 articles were dealt with by stoving or destruction, was as follows:—

				£	s.	d.
Salaries	-	-	-	-	72	0 0
Gas	-	-	-	-	17	6 0
Horse hire	-	-	-	-	17	9 6
Sundries	-	-	-	-	0	1 6
				<hr/>		
				£106 17 0		

It has, however, been the practice to charge persons who are able to pay for the disinfection of their clothing, &c. at the rate of 10*s*. for each stove full of articles dealt with; and during the past three years the mean annual sum so received has been 28*l*. 1*s*. 8*d*. But the Corporation have become more and more unwilling to press for these payments where they are not voluntarily made, and in the year ending March 1881, the amount so received was the smallest within recent years, namely, 21*l*. 2*s*. 6*d*. This sum being deducted from the amount above named, reduces the total cost of the establishment for the year ending March 1881, to 85*l*. 14*s*. 6*d*.

Disinfecting  
stove at the  
General Hos-  
pital.

A similar stove has, as already stated, been in use at the Nottingham General Hospital since 1871. It is periodically packed full of bedding, blankets, pillows, &c., and used in much the same manner as at the Corporation "station." I am informed that no articles have been injured in it, and that frequent stoving of the same articles has not been found to cause appreciable damage.

OLDHAM URBAN SANITARY DISTRICT.

Population in 1881, 111,343. Rateable value, 477,592*l*.

Small-pox  
epidemic  
leading to  
provision of  
hospital.

In 1877 small-pox became epidemic in the borough of Oldham, and it was then determined to erect the existing hospital. The preparation of the site and the construction of the building occupied 20 weeks, and the hospital was not ready for the reception of patients until early in January 1878, when the epidemic had ceased. Indeed, only two small-pox patients were admitted.

Site and soil.

The site consists of an acre of land in a fairly isolated position just on the outskirts, and at the north-western extremity of the borough. It lies about one mile and a half from the centre of the borough, and about three miles and a half from its furthest portions. It forms part of a plot including a ravine which was purchased by the Corporation as



a depôt for the refuse from building operations, furnaces, &c. The soil is clay. APP. NO. 1.

The hospital buildings which constitute the so-called "Westhulme Hospital," consist of the hospital proper, a porter's lodge at the entrance to the grounds, a detached laundry with coal-store, &c., and a mortuary. They are surrounded by a wooden fence some 6 feet high. The grounds are divided by similar fences into three separate recreation grounds for patients suffering from different diseases. The hospital is a one-storied wooden building well raised above the surface on brick foundations, and having its internal walls also of brick. The outer walls are weather-boarded outside, and match-boarded inside. Including the space between the two layers of wood they are 6 inches in thickness. To the front is a long building containing the entrance hall, which is fitted with fire-plugs, hose, and buckets; also all the administrative offices, such as the medical officer's room and dispensary, the matron's rooms, bedrooms for nurses, &c., kitchens, scullery, store-rooms; and three private wards for single patients. All these apartments open into a corridor behind which runs the whole length of the building. Opening out from the opposite side of the corridor and projecting from it at right angles are three ward-pavilions, the opposite side windows of which face north-west and south-east respectively. The corridor itself is ventilated by means of doors and windows at either end, by large windows on the side where the ward pavilions are placed, and by smaller ones on the opposite side.

On the Use  
and Influence  
of Hospitals  
for Infectious  
Diseases, by  
Dr. Thorne.

Hospital  
buildings.

The three ward pavilions are alike. A lobby which is shut off from the corridor, and which has on one side a nurse's room, and on the other a bath-room and a ward-sink, leads to the ward itself. Each ward is 50 feet long and 27 feet broad. The ceiling which is lined with varnished wood rises with the roof for a horizontal distance of 6 feet on either side, and is flat for the remaining 15 feet; and the ward, which is nearly 10 feet high to the wall-plate, thus has a mean height of about 12 feet. Each ward contains eight beds, there being thus 168 feet of floor space, and somewhat over 2,000 cubic feet, per bed. The private ward contains from 144 to 183 square feet, and from 1,700 to 2,260 cubic feet each. In all, there are 28 beds available for patients. The construction of a fourth pavilion, which will be completely detached from the others, has recently been determined on. This latter pavilion is intended to be of a permanent character.

At one end of each ward and opening out from it at the side is a projecting building containing three charcoal closets and a store room for charcoal; the closets being themselves provided with means of cross ventilation, and being separated from the wards by a cross-ventilated lobby.

Each ward has eleven windows, four on either side and three at the end facing the door. The lower parts of the windows are fixed, a pivot-hung sash at the top of each, measuring 3 feet by 18 inches, alone opening. Ventilating openings are, however, situated about 6 inches above the floor level, and also above each window. In the centre of each ward there is also an opening through the roof, and a ring of gas jets is kept constantly burning in it so as to cause an upward current of air. Two of the wards are divided into two equal parts by means of a partition 7 feet in height, so as to separate convalescents, especially when children are under treatment, from those who are in a more acute stage. The wards are neatly furnished: they are also fitted with folding screens of wooden louvred work by which either one or several beds can be shut off from the others without any undue interference with the ward ventilation. The bedsteads are of iron, fitted

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Warming, water-supply drainage, &c.

Total admissions to hospital

Admissions from the borough.

with excellent "diamond spring mesh" wire mattresses, which are not only extremely cleanly, but are highly spoken of in point of comfort. The beds and mattresses are in one, and are manufactured by Mr. J. Port, of Ancoats, Manchester. Over the mattresses are placed palliasses of rye-straw, the contents of which are burned after each use. The walls are coloured with a light blue distemper, and the windows are fitted with both green and buff blinds.

In every ward is a metal-lined box fitted with a plug at the bottom, and running on india-rubber wheels. It always contains a "disinfecting liquid," and into it all soiled linen is placed. It is regularly removed from the ward, and on reaching the corridor it runs on to a "tram" leading to the laundry.

The buildings are throughout warmed by means of hot-water pipes. The water-supply is from the Corporation mains; and the drainage, which is provisional, is into certain tanks fitted as filters. From these the sewage passes into a sewer, and on into a brook in the Chadderton Urban Sanitary District.

The admissions have hitherto been limited to patients from the urban district and to paupers from the Oldham Union. They have been as follows:—

TOTAL ADMISSIONS to HOSPITAL in Three Years, 1878-80.

Date.	Small-pox.	Scarlet Fever.	Diphtheria.	Fever.	Other Diseases.	Total.
1878 ... ..	2	82	0	21	1	106
1879 ... ..	3	71	2	15	3	94
1880 ... ..	5	73	0	30	3	111
Three years { 1878-80. }	10	226	2	66	7	311

Out of the 311 patients admitted in the three years, 291 were admitted from the borough, and 63 were sent in by the guardians, from places beyond the borough limits.

The number of cases of infectious diseases admitted from the borough as compared with the total deaths registered from the corresponding diseases has been as follows:—

ADMISSIONS from the BOROUGH.

Date.	Small-pox.		Scarlet Fever.		Diphtheria.		"Fever."	
	Deaths registered.	Admitted to Hospital.	Deaths registered.	Admitted to Hospital.	Deaths registered.	Admitted to Hospital.	Deaths registered.	Admitted to Hospital.
1878 ... ..	1	1	240	78	26	0	36	21
1879 ... ..	0	3	136	71	19	2	25	12
1880 ... ..	0	4	131	71	9	0	28	28
1878-80 ...	1	8	507	220	54	2	89	61



It will thus be seen that, comparatively speaking, the number of admissions to the total cases from each disease which must have prevailed in the borough, has been small. This is to a great extent due to the fact that early intimation of the existence of cases of infectious diseases has not been procurable. The Corporation have for some years past issued stamped forms to all registered medical practitioners and to all masters and mistresses of elementary schools, in which such cases could be reported, and they have paid 2s. 6d. to the medical men, and 1s. to the masters and mistresses for each notification received. The notification has, however, so often been received when it was practically useless, the time having passed when it was possible to stay the spread of the disease by means of isolation, and having regard to this experience the Corporation have recently acquired powers under the Oldham Improvement Act, 1880, for the compulsory registration of infectious diseases.

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On the Use  
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for Infectious  
Diseases, by  
Dr. Thorne.

Notification  
of infectious  
diseases.

The fact, however, that as many as 220 cases of scarlet fever were removed to the hospital during the first three years of its existence is very noteworthy, the more so as the majority of the patients were young children. The success is, to some extent, deemed to be due to the fact that immediately on the completion of the hospital it was thrown open for public inspection for one week, and, to quote from the report of the Medical Officer of Health, it was "during that time visited by about 13,000 of the inhabitants, most of whom were loud in their praise of the comfort and accommodation it was calculated to afford." The hospital has, however, since then acquired a good reputation amongst all classes, and mothers refusing to part with their children are, in the first place, advised to consult others whose children have been under treatment there, and if this fails to remove their objections, they are informed that they can go in with them. The restrictions to which such parents are necessarily subjected when in the hospital soon induces them to leave their children, and there are but few who have not within a few days returned to their own homes. Before leaving they are required to take a bath, and their clothing is disinfected.

Admission of  
young children  
and mothers.

Of the 200 patients admitted in 1878-79, the ages of 118 or 59 per cent. varied from a few months to 10 years, as under:—

Under one year of age	-	-	4 patients.
One year	-	-	5 "
Two years	-	-	7 "
Three years	-	-	21 "
Four years	-	-	17 "
Five years	-	-	14 "
Six years	-	-	13 "
Seven years	-	-	17 "
Eight years	-	-	6 "
Nine years	-	-	11 "
Ten years	-	-	3 "
			<hr/> 118
Above ten years	-	-	- 82
			<hr/> 200

The social status of the patients has not varied much. By far the majority of those admitted have belonged to the artisan class; there have also been a few domestic servants. The members of some tradesmen's families have come in as "private patients," occupying separate rooms.

Social status  
of patients.

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On the Use  
and Influence  
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for Infectious  
Diseases, by  
Dr. Thorne.

Public Health  
Act, 1875, s. 124.

Public Health  
Act, 1875, s. 132.

Oldham Rural  
Sanitary  
Authority, &c.

General and  
medical ad-  
ministration.

Disinfecting  
apparatus.

In the early history of the hospital it was found necessary in a few cases to remind persons of the powers of compulsory removal to hospital vested in the Sanitary Authority, and in one case certain preliminary steps were taken with a view of securing a magistrate's order under section 124 of the Public Health Act, 1875. The difficulties in this regard have, however, steadily diminished, and actual compulsion has never been resorted to.

The Sanitary Authority have from the first regarded the removal of patients to hospital as a step adopted, not so much for their own welfare, as for the protection of the public from infection, and with the exception of patients occupying private rooms, no charge has in consequence been made as regards non-paupers resident within the borough. In the case of patients occupying private rooms a sum varying, according to the accommodation required, from 31s. 6d. to 52s. 6d. per week is charged. This payment has always been voluntarily made, and no action has hence been necessary under section 132 of the Public Health Act, 1875. The Guardians pay 2s. 6d. per day for each patient sent in.

In a return made to the Local Government Board in 1879 the Rural Sanitary Authority of Oldham refer to this hospital as available for the purposes of their district. No cases have, however, been sent in, and as far as I could learn any arrangement which existed is no longer in force. Several adjoining Urban Authorities have, at their request, been offered accommodation in the hospital. The terms asked have been an annual payment at the rate of 3*l.* per 1,000 inhabitants and 6s. per day for each patient. Hitherto none have accepted the terms offered. The Oldham Infirmary send in all their infectious cases free of charge.

The general and medical administration of the Westhulme Hospital is vested in Dr. J. M. Sutton, the borough Medical Officer of Health, and it would be difficult to find an establishment of the same character where every detail of administration has been more carefully thought out. An air of comfort and of scrupulous cleanliness obtains throughout, and in view of the fact that the several ward-pavilions all open into the same corridors, strict regulations, hitherto successful, are in force to prevent disease spreading from one ward to another. On the admission of patients they are all provided by the Sanitary Authority with a complete outfit, the several outfits consisting of a variety of patterns, so as to avoid the appearance of a uniform. A clean brush and comb in a numbered bag is also given to each patient.

The clothing worn on admission is washed and disinfected in the Corporation stove, and then set aside until the patients leave. Patients occupying private rooms are alone allowed to wear their own clothing.

Dr. Sutton has also been appointed physician to the hospital, but private patients can at their own cost call in the services of any other registered medical practitioner. As yet no salary has been paid for the services rendered by Dr. Sutton at the hospital, it being deemed desirable that further experience should be gained as to their extent. In the meantime, Dr. Sutton is provided by the Corporation with a carriage, which materially facilitates his frequent visits to the establishment.

In one of the yards belonging to the Corporation there is a disinfecting apparatus, a "destructor," an ambulance, and a mortuary.

The disinfecting apparatus is a vaulted brick chamber fitted with trellised teak shelves, the hot air passing into it from a furnace below. The practice hitherto has been to raise the temperature from the chamber to 245° Fahr., and to leave articles to be disinfected exposed in it for two hours and a half. The articles dealt with have included velvets, silks, and other delicate materials, but only once when some damp things were put in has anything been damaged. Dr. Sutton also informs me



that no case has ever come under his notice in which infection has been conveyed by any articles dealt with in this stove. With a view of ascertaining the penetrating power of the temperature in the stove, a pillow stuffed with "mill-puff" and weighing  $3\frac{1}{2}$  lbs. was recently placed in the stove after the temperature had been raised to  $245^{\circ}$  Fahr., and a registering thermometer placed in the centre of the pillow was examined every half hour during three consecutive hours. The following are the results recorded:—

APP. NO. 1.  
On the Use  
and Influence  
of Hospitals  
for Infectious  
Diseases, by  
Dr. Thorne.

Length of Time in Stove.	Heat indicated by Thermometer outside the Pillow.	Heat registered with Centre of the Pillow.
$\frac{1}{2}$ an hour ... ..	268 F.	120° F.
1 hour ... ..	266 F.	160° F.
$1\frac{1}{2}$ hours... ..	266 F.	181° F.
2 hours ... ..	267 F.	200° F.
$2\frac{1}{2}$ hours... ..	267 F.	213° F.
3 hours ... ..	270 F.	230° F.

No experiments have yet been made with a view of ascertaining how long a uniform temperature of  $245^{\circ}$  Fahr. or  $250^{\circ}$  Fahr. must be maintained in order to penetrate such an article as a bed or a pillow.

The number of articles dealt with in this stove during the six years, 1875-80, is as follows:—

—	1875.	1876.	1877.	1878.	1879.	1880.
Blankets ... ..	152	299	512	559	557	634
Sheets .. ...	163	359	431	471	333	367
Pillows ... ..	81	501	602	742	707	661
Bolsters ... ..	69	294	367	405	342	350
Quilts, &c. ... ..	—	314	424	469	417	458
Mattresses ... ..	180	77	206	158	284	383
Beds ... ..	—	461	460	517	475	468
Carpets ... ..	—	90	201	178	167	247
Rugs ... ..	44	23	55	36	49	72
Curtains ... ..	—	15	30	54	42	126
Articles of clothing...	66	540	2,385	773	1,168	1,824
Sundries ... ..	112	333	588	975	593	1,255
Totals... ..	867	3,306	6,261	5,337	5,134	6,845

During the same six years 466 articles were destroyed by burning in the "destructor."

Destruction  
of infected  
articles.

Articles to be disinfected or destroyed are removed in a dark brown van by men wearing a grey uniform similar to that worn by the person in charge of the stove and the destructor. Those which have been stoved are put into another conveyance, which is of a light mahogany colour, and are taken back by a driver wearing a blue uniform.

Removal, &c.  
of infected  
articles.

In addition to the above steps, the Inspectors of Nuisances, under Dr. Sutton's supervision, pay frequent visits to houses where infectious disease prevails, and they provide disinfectants, giving at the same time directions as to their use. They also supply the poor with carbolated soap for washing purposes. A large number of infected premises are also annually submitted to disinfection by the fumes of burning sulphur.

Disinfection of  
houses, &c.

The details of this work for the six years, 1875-80, are as follows:—

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	1875	1876.	1877.	1878.	1879.	1880.
Cases of infectious disease visited.	665	828	405	939	459	883
Number of visits paid	5,037	5,547	2,512	5,245	3,178	2,986
Houses disinfected ...	263	504	370	502	459	439
Rooms disinfected ...	477	983	1,016	1,552	1,433	1,318

No charge is made for the disinfection to any persons resident within the borough. Articles destroyed are replaced if the owners are poor; other persons as a rule gladly consent to their destruction without compensation.

Ambulance

The ambulance is a neat light conveyance, resembling a private omnibus. It opens at the back to receive a movable stretcher in which the patient can, if necessary, be carried from his bed. The stretcher can also be so arranged as to enable the patient to occupy a recumbent or sitting posture. A seat is also provided inside for a nurse or other attendant. The conveyance, which weighs a little over 11 cwt., without the movable stretcher, was specially manufactured by Messrs. Harding & Co., of Oldham, at a cost of 75*l.* After each use it is disinfected with the fumes of burning sulphur. (See Plate No. XXX.)

Mortuary.

The mortuary has adjoining it a post-mortem room. It is used for "inquest cases," and at times for the reception of the bodies of persons dying of infectious diseases. Thus the Sanitary Authority some time since removed the body of a scarlet-fever patient from a house where a "wake" was about to be held.

Influence of hospital on surrounding district.

In no instance has it been suggested that the hospital, or the ambulance, has in any way led to the spread of infection either near to the hospital or elsewhere.

Cost of construction.

The original cost of the hospital was:—(a.) for buildings, 4,379*l.*; (b.) for furniture and fittings, 1,571*l.*, making a total of 5,950*l.* A rent of 100*l.* per annum is paid by the Sanitary Committee of the Corporation to the Finance Committee, for the site.

Cost of maintenance, &c.

The current expenses include the wages of the permanent staff, including the matron, one head and two under nurses, two probationers, a scrubber, a general servant, and the porter and his wife, the latter of whom acts as cook. They amounted in 1878 to 517*l.*, in 1879 to 760*l.*, and in 1880 to 777*l.* During these three years sums amounting respectively to 6*l.* 11*s.*, 42*l.* 17*s.* 5*d.*, and 10*l.* 10*s.*, were refunded to the Corporation by private patients and the guardians.

PEMBERTON URBAN SANITARY DISTRICT.

Population in 1880, 13,763. Rateable value, 47,000*l.*

Origin of hospital.

In May 1874, small-pox broke out in Pemberton, and soon became epidemic. Later on the Sanitary Authority determined to erect a hospital in order to isolate the sick. This step was rapidly carried out, and in July a wooden building, with a separate wooden administrative block, was in readiness. The buildings were put up in the corner of a large field, occupying an isolated but central position in the district. The piece of ground properly belonging to them is only about 100 feet × 70 feet; it is not enclosed; and the Sanitary Authority only rent it by the year. The hospital itself has been, in the main, constructed on the principles laid down in the Board's Hospital Memorandum, there being two wards provided with means of cross ventilation, and separated in the centre of the building by a room for the nurse, and a store room,

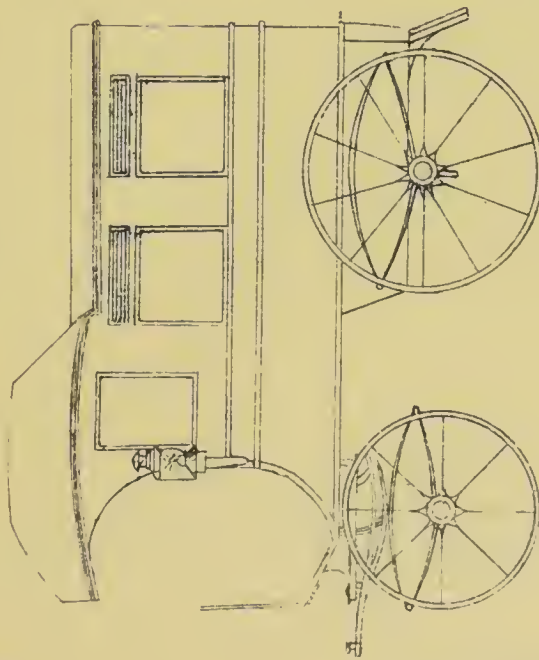


# HOSPITAL FOR INFECTIOUS DISEASES.

## AT OLDHAM

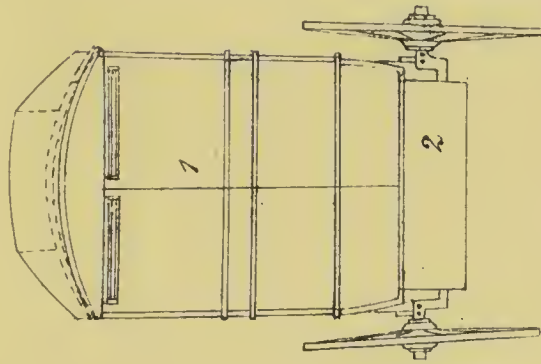
### PLAN OF AMBULANCE

No 1.



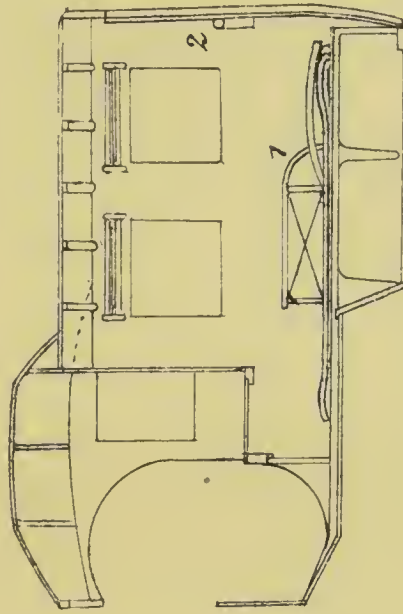
3 4 Inch Scale.

No 2.



1. Back view of Ambulance showing the doors.
2. Step which is let down when required.

No 3.



#### SECTION SHOWING INSIDE

- 1 Moveable Stretcher.
- 2 Lamp.

Weight of Van without Moveable Stretcher 11.2.14  
cwt. lbs

Wm Harding Coach Builder  
Oldham.  
Lancashire.





both opening into a passage leading from one ward to the other. Each ward contained eight beds.

All the buildings were, however, constructed of single over-lapping  $\frac{3}{4}$ -inch deal board coated outside with tar; and so hurriedly were they put together that the rain found its way into the wards from the first. Some 200 cases of small-pox occurred in the district between May and November 1874, but only about a dozen cases were received into the hospital. To some extent this was due to the fact that a large portion of the epidemic was over before the hospital was ready, but it is stated to be mainly accounted for by the unwillingness of the population to avail themselves of the accommodation provided. In this connexion it must, however, be noted that the building was, admittedly, never in a fit state for the reception of the sick, and, whatever its internal arrangements were, it was externally a most unattractive-looking structure. In one instance where a lodger in an overcrowded house contracted the disease, the Sanitary Authority procured an order from the magistrates for his removal to the hospital, all other efforts to secure that end having failed. The ambulance from the Wigan workhouse was borrowed and taken to the house, where a large crowd soon assembled and considerable excitement prevailed, the patient still objecting to be removed, and all present refusing to assist the Inspector of Nuisances in carrying out the magistrate's order. Several policemen were present with a view of furthering the object of the Sanitary Authority; they were, however, instructed to limit themselves to the prevention of any breach of the peace. Having regard to all the circumstances, the Medical Officer of Health, after visiting the patient, expressed the opinion that any further effort at removal would probably be injurious to the patient himself, and nothing further was done in the matter.

Since 1874 the hospital has only been used on one occasion, although sums of money have been spent in repairing it. In 1877 it was found to be in such a dilapidated state that one half of it was pulled down, and some 40*l.* spent in repairing the other portion. When I visited it I found that rain made its way easily into the remaining ward, the edges of the planks being in some places more than half an inch apart. The administrative block is now occupied by a miner and his wife, who in return for residence there rent free, together with a gratuitous supply of coals, are expected to take care of the premises. The walls of this block are now water-tight, but rain still makes its way in at the roof. In short, the buildings are quite unfit for the purposes of a hospital, a circumstance the more to be regretted in view of the extensive prevalence of infectious diseases in the district, and the fact that the population consists to a large extent of miners, who have no means for isolating the sick in their houses. In 1878 there were seven deaths from scarlet fever and 18 from "fever"; in 1879 there were 45 deaths from scarlet fever and 20 from "fever."

The original cost of the hospital buildings was 378*l.*, and a further sum of 47*l.* was spent in furniture and fittings. Since then the current expenses have been limited to a payment of 3*l.* a year as rent for the site, together with certain sums for repairs and a supply of fuel.

APP. No. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Imperfect character of buildings.

Adoption of compulsory measures for securing isolation.

Cost of construction and maintenance

#### PENRITH URBAN SANITARY DISTRICT.

Population in 1881, 9,268.

#### PENRITH RURAL SANITARY DISTRICT.

Population in 1871, 15,420.

In 1871 two wooden hospital huts were hurriedly erected by the Urban Sanitary Authority of Penrith in consequence of an outbreak

Origin of hospital.

## APP. NO 1

On the Use  
and Influence  
of Hospitals  
for Infectious  
Diseases, by  
Dr. Thorne.

of small-pox. The first hut was completed in 10 days, the second soon afterwards, and 27 cases were admitted; the isolation thus afforded, coupled with a large amount of vaccination which was at the time carried out, staying the spread of the disease. In 1876 the Penrith Rural Sanitary Authority agreed to combine with the Urban Authority in the use of these huts, and as the result of this arrangement the buildings were made much more substantial and were otherwise improved.

As now altered the hospital buildings consist of two completely detached one-storied blocks, having single brick walls, tiled roofs, and each containing two wards together with certain administrative offices. They stand on about half an acre of land which is separated by an open iron fence from a large piece of pasture land known as Fair Hill some 17 acres in extent, and belonging to the Urban Authority.

## Site and soil.

Fair Hill occupies an isolated position at a considerable elevation to the north of, and about half a mile from, the town. Several fairs are held there, and it is also used by the militia as a drilling ground. The soil is red sandstone rock.

## Hospital buildings.

Both wards in each of the two blocks have a little over 200 square feet of floor space and a cubic capacity of 2,080 feet. They were designed for two beds each, but have, both when small-pox was epidemic in 1871 and in the early part of 1880, contained more beds, and they have thus been considerably overcrowded. In one block both wards have two pivot-hung windows in one wall and one in each of the two other walls; the kitchen has to act as nurse's room, and the only watercloset opens directly into it. In the second block one ward has similarly constructed windows on three sides; the other in two adjacent walls only; there is a nurses' room apart from the kitchen; and there are two waterclosets, both however opening directly into the wards. All the wards have louvred openings in the roof, and air bricks in the walls below the ceiling level. Adjoining one of the blocks is a shed containing a carriage which, though lined partly with cloth, serves the purposes of an ambulance.

## Water-supply and drainage.

Water is laid on to the premises from the public mains, the service being derived from the river Eamont about 4 miles below Ulswater. The drainage is defective: the slop water escaping at some little distance from the hospital on to the surface of the land, and the watercloset contents entering into a cesspool sunk in the porous sand rock. There is no bath, and no apparatus for the disinfection of infected linen, bedding, &c., such measures as are adopted in this direction being limited to the use of carbolic acid and of sulphur fumes.

## Admission of patients.

Until quite recently the hospital has been but little used since the cessation of the small-pox epidemic in 1871. In 1875, three children suffering from scarlet fever, together with their mother who accompanied them and nursed them, were admitted. In 1876, two cases of small-pox were admitted, one of these being the only case as yet sent in by the Rural Sanitary Authority. No further cases were sent in until March 1880, when scarlet fever broke out in the town of Penrith; and between March 13th and May 7th, 17 cases of this disease were admitted. The accommodation at the hospital was, however, found to be incapable of affording isolation for so many cases at one time, even when four beds were placed in some of the wards, and in more than one instance patients had to wait some days before they could be received. Of the patients admitted some were paupers whom it was thought desirable to treat at Fair Hill instead of their being sent to the detached infectious wards at the workhouse; the Urban Sanitary Authority raising no objection to the admission of this class of patients, provided they come from the urban district. Six of the patients were

Admission  
(a) of paupers;

## (b) of children.



children varying in age from 18 months to 11 years. In the case of the youngest patient the mother also went into the hospital and assisted in nursing her child.

As a rule the majority of the patients have paid something towards the expenses of their maintenance at the hospital, the charge varying from 5s. to 10s. a week according to their means. The Urban Authority have, however, as regards the poorer patients, let it be understood that they will not be pressed beyond their ability to pay, and in a few such cases they have secured the removal of patients by undertaking in advance not to make any charge. The pauper patients admitted are paid for by the guardians, and are attended by the Poor Law Medical Officer. All other patients have hitherto been attended by private practitioners at their own cost. No person has been removed to the hospital under the provisions of section 124 of the Public Health Act, 1875.

The general and medical administration of the hospital is in the hands of Dr. J. D. Robertson, Medical Officer of Health to the Urban and Rural Districts, he being immediately responsible to a committee consisting of three members of each of the two Authorities. The buildings, including the alterations made in 1876, cost 320*l.*, and a further sum of 83*l.* was spent in furnishing. Towards the cost of the original huts the Rural Sanitary Authority, in 1876, paid a sum of 50*l.*, and all permanent expenses since that date have been divided between the two Authorities on the basis of their respective rateable values; the Urban Authority paying one third, the Rural Authority two thirds. When the hospital is empty it remains in charge of a woman resident in the town, who is retained by a fee of 2*s.* 6*d.* a week, to act as nurse whenever required. When patients are under treatment she receives 1*l.* a week, together with board, fire, and lights; and extra help is offered her as it may be required.

I could not learn that any suspicion had arisen that the use of this hospital had, either during the removal of the patients, or otherwise, been the means of causing any spread of infection.

#### ROCHFORD RURAL SANITARY DISTRICT.

Population (? 13,000).

#### SOUTHEND URBAN SANITARY DISTRICT.

Population in 1881, 8,064.

In September 1878, and owing to the occurrence of some cases of small-pox within their district, the Rural Sanitary Authority of Rochford took on lease, as a hospital, for a term of seven years and at an annual rental of 50*l.*, an old farm-house about half a mile from Rochford and 3½ miles from Southend. The Southend Urban Authority combined with the Rural Authority for the purpose, agreeing to pay 15*l.* towards the rent, and 10*l.* towards certain repairs and alterations which were necessary, and which in all amounted to 35*l.*

The hospital premises include about half an acre of garden ground; they adjoin a main road, and stand about 100 yards from the nearest dwelling. The house itself, in addition to kitchen and other offices, has five rooms available for patients, these rooms severally containing from about 1,125 cubic feet to 1,875 cubic feet. Earth-closets have been provided. The drainage is into a cesspool, and the water-supply is from a well on the premises. Concerning the cesspool and the well not much information was, at the date of my visit, available.

The hospital has never been used since it was provided; indeed it is admittedly looked upon as principally available for any cases of infec-

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Payments by patients and others.

Medical attendance.

Section 124, Public Health Act, 1875.

Adminis-  
tration.

Cost of construction and maintenance.

Influence of hospital in surrounding neighbourhood.

Origin of hospital.

Site, buildings, &c.

Hospital practically a pauper institution.

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tious diseases arising amongst paupers. The little furniture it contains is of the meanest description, and comes from the workhouse. It is intended that the building shall be administered from that establishment, and it is in charge of the workhouse officials.

On two occasions only since 1878 does any use of the building appear to have been entertained. The first was on the occurrence during the autumn and winter of 1879 of a severe epidemic of enteric fever at Prittlewell in the Southend Urban District. In that case, however, the question of isolation was only raised when most of the patients were convalescent, and when the sick poor finding themselves well-cared for and nursed by private charity, refused to comply with such suggestions of removal as were made to them. In the second instance a member of a gentleman's family having returned to Southend from a house where scarlet fever was prevalent, temporary isolation was deemed advisable, but on its being ascertained that the hospital could only be administered from the workhouse, no further action was taken in the matter.

#### SAFFRON WALDEN URBAN SANITARY DISTRICT.

Population in 1881, 6,056. Rateable value, 24,000*l*.

#### SAFFRON WALDEN RURAL SANITARY DISTRICT.

Population, estimated in 1881, 12,000. Rateable value, 81,600*l*.

The hospital for infectious diseases belonging to the Urban and Rural Sanitary Authorities of Saffron Walden was formerly the parish "pest-house." In 1874 it was purchased by the two authorities whose districts together form the Saffron Walden Union. A central staircase was removed and built in an annex, the arrangement of the rooms was altered, and the building was otherwise adapted to its present purposes. It occupies a somewhat elevated and completely isolated site, about half a mile to the south of the town of Saffron Walden, and it is approached from the main road by a "green lane," down which a roadway has been made, and which is some 300 yards in length. The building stands in about a quarter of an acre of land, but the "green lane" is for a considerable distance also available for the purposes of a recreation ground.

Hospital  
buildings.

The hospital buildings which form part of what is locally known as the "District Infirmary," consist of—1<sup>o</sup>, a two-storied cottage; and, 2<sup>o</sup>, certain outbuildings.

On the ground floor are, an entrance lobby containing the staircase, and three rooms. One is a ward measuring 34 feet × 14 feet × 10 feet, and having casement windows in the two end walls, and in one side wall, and two open fire-places, the second is a "convalescent room," measuring 13 feet × 10 feet × 10 feet, having windows in two adjacent walls and an open fire-place; the third is a kitchen. On the first floor is a ward of the same dimensions as the one already described, and also two bedrooms having much the same floor space as the two smaller rooms downstairs, but less cubic space, owing to the sloping roof. One of these latter rooms is available for a nurse, and the other is reserved for the caretaker and his wife. Each of the large wards contains four beds; there being thus 119 square feet, and 1,190 cubic feet per bed. The hospital is but meagrely furnished; the beds are of oat-chaff, which is destroyed after each use.

The outbuildings consist of—1<sup>o</sup>, an ambulance shed, containing a covered wagonette, stripped of its linings and painted throughout; 2<sup>o</sup>, an earth-closet; 3<sup>o</sup>, a coal and wood shed; 4<sup>o</sup>, a wash-house; and, 5<sup>o</sup>, a



room containing a bath and a disinfecting apparatus, and which has also to serve as a mortuary. The disinfecting apparatus is an iron box on wheels, with a stove beneath. Its disinfecting power by heat is not relied on, all articles dealt with in it being also exposed to chlorine fumes.

The water-supply is derived from a well sunk through clay into a gravel bed, and the slop-water is dealt with by means of a rude surface irrigation.

The hospital was opened early in 1875, and the number of cases isolated both from the urban and rural districts, in the six years, 1875-80, together with the deaths registered in the respective districts from the diseases specified, are given in the following Table. Of the 26 cases of enteric fever, which were isolated, 18, viz., 3 from the urban and 15 from the rural district, were treated in the "Saffron Walden Hospital," a general infirmary where separate accommodation is reserved for five cases of enteric fever, this being the only infectious fever admitted. They are included in the annexed Table, so as to show the total amount of isolation in hospital which has been carried out in the two districts.

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Water-supply and drainage.

Admission of patients.

Date.	Small-pox.				Scarlet Fever.				Enteric Fever.			
	Urban District.		Rural District.		Urban District.		Rural District.		Urban District.		Rural District.	
	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.	Deaths.	Admissions.
1875 ... ..	0	0	0	0	2	0	1	4	1	2	2	8
1876 ... ..	0	1	2	0	0	1	0	0	2	0	3	3
1877 ... ..	1	6	0	1	0	1	0	0	0	0	1	2
1878 ... ..	1	1	1	11	0	1	1	1	0	0	0	1
1879 ... ..	0	0	0	0	0	1	5	0	0	0	5	3
1880 ... ..	0	0	0	0	0	1	1	0	1	1	1	6
1875-80 ... ..	2	8	3	12	2	5	8	5	4	3	12	23

Although the hospital occupies a fairly central position in the Saffron Walden Union, some of the more populous villages lie as far as seven and nine miles away from it, but I am informed by Dr. W. Armistead, Medical Officer of Health for the district, that when he or the Inspector of Nuisances get early information of the existence of infectious disease, the question of distance has not in any case interfered with the removal of the patients; indeed, some of those included in the above Table have come from several of the more distant villages.

Early isolation is also, in nearly all parts of the union, greatly favoured by a voluntary system of notification of infectious diseases adopted by nearly all the medical practitioners, as regards patients who are in their opinion without proper lodging and accommodation, when suffering from any infectious fever. Such notification is often made by telegram, the cost of which is repaid by the respective Sanitary Authorities, and as the result of it, Dr. Armistead informs me that no second

Voluntary notification of infectious disease.

Results of early isolation.

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case of infectious disease has ever arisen in a house from which such early removal to hospital has been effected. This system of notification is, however, not general, the cases from one portion of the rural district being either not reported at all, or being only reported when the disease has spread, and removal to hospital has come too late to be of much benefit to the community concerned. Thus, as regards scarlet fever, Dr. Armistead in his annual report on the rural sanitary district for 1879 writes: "About 50 cases of scarlatina occurred at Wimbish during the year, and 20 cases at Radwinter, all connected directly or indirectly one with another. The disease was in the first instance confined entirely to one family at Wimbish, and might have been limited to a very few cases had proper precautions been taken at once to put a stop to the epidemic."

Incidental uses  
of the hospital.

The hospital has, however, even in those tardily reported cases, been of value, for convalescents have occasionally been removed there until they were deemed free from infection. Thus a convalescent from scarlet fever was once removed from a row of cottages where it was known there were many children not protected by previous attacks, the clothing, &c. was at the same time "disinfected," and the house was lime-washed; the result being that no spread of the disease took place. Occasionally, also, suspected cases of infectious diseases have remained at the hospital for a few days in "quarantine," until found to be free from any infectious disorder. And in at least one instance the vaccinated children of parents suffering from small-pox have with their parents been removed to the hospital, instead of being sent to relatives or the workhouse.

Simultaneous  
treatment of  
two diseases  
in hospital.

As the hospital is not adapted to the simultaneous treatment of two diseases, it is fortunate that patients suffering from two different infectious disorders have, with one exception, never been isolated there at the same time. In the case referred to a well-vaccinated convalescent from scarlet fever remained with impunity in hospital for a few days after the admission of a small-pox patient, special precautions being taken to prevent any spread of infection from one patient to the other.

Social status.

The patients admitted have belonged, almost exclusively, to the labouring classes; a few being domestic servants. Some of them have been paupers, but with the exception of one patient suffering from small-pox, and who was at the time the only patient under treatment, none have been admitted in pauper dress, and it is hence not believed that they have been known to be paupers.

Payments by  
patients.  
Public Health  
Act, 1875, s. 132.

No charge is made to patients either to cover the establishment expenses or the cost of the nurses, who are procured from a training institution at Witham, but the actual cost for the maintenance of patients is, as a rule, charged, it being remitted in part or in whole when the circumstances of the patients or their friends render such action desirable. When, as occasionally happens, a mother is admitted together with a sick child, or a wife with a husband, the same principle is adopted with regard to the cost for the maintenance of the relation in attendance; the whole of the expenses being in certain instances borne by the Sanitary Authority from whose district the patient has been removed. No action has been taken under section 132 of the Public Health Act, 1875, with a view to the recovery of any amounts due.

Public Health  
Act, 1875, s. 124.

On one occasion it was found necessary in the urban district to take certain preliminary action under section 124 of the Public Health Act,



1875, with the view of securing the compulsory removal of a scarlet-fever patient. The parents of the patient, however, consented to the removal when they found legal proceedings were actually being adopted.

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The general administration of the hospital is carried out under the supervision of Dr. Armistead, who is responsible, in this matter, to a hospital committee consisting of three members of the Rural, and two members of the Urban, Sanitary Authorities. The Inspector of Nuisances visits the hospital when necessary, and has instructions to arrange for the admission of patients whenever he receives any communication from a medical practitioner that removal to hospital is in any case desirable.

General and  
medical  
supervision.

If the disease to be isolated were however different from that from which any patient already in the hospital was suffering, no action would be taken without reference to Dr. Armistead. The Inspector of Nuisances also ascertains the amount and nature of the provisions needed by patients, and these are then procured through the Master of the workhouse. This latter officer is selected to make the purchases on behalf of the Hospital Committee, because he has exceptional facilities for so doing at a reasonable cost, but he does not visit the hospital when patients are under treatment. The caretaker and his wife reside on the premises; they receive 10s. a week together with fuel and lights, and they provide their own board whether patients are under treatment or not. The wife acts as nurse when only one or two patients are under treatment, and when a trained nurse is not deemed necessary.

Mr. H. Stear, M.R.C.S., of Saffron Walden, attends all patients who do not at their own cost call in the services of some other medical practitioner. Mr. Stear is also medical officer to the workhouse, but I am informed that owing to the nature of his practice, he is so little identified with poor-law work, that this arrangement in no way interferes with the admission of patients. Hitherto, Mr. Stear's services to the Sanitary Authorities in this matter appear to have been gratuitous.

Visitors have not as yet in any case been admitted into the hospital, but they are allowed to see convalescent patients at a distance, out of doors.

Visitors.

The hospital itself occupies a very isolated position, and no spread of infection from it to any dwellings has ever been suggested. On one occasion, however, it is considered probable that a case of small-pox arose through infection by means of the ambulance. After the removal of some small-pox cases from Wimbish, the driver of the ambulance, who was subsequently found to be untrustworthy, allowed a boy to ride on the step of the carriage, during its return to a coach-house which was situated in the town, but which is now no longer in use. The boy himself was well protected by vaccination and did not suffer, but it is believed probable that an unvaccinated woman, living next door, and who sickened 23 days after the boy's ride on the ambulance step, contracted the disease from him either by means of his infected clothing or otherwise. This person, who experienced a severe attack of confluent small-pox, had, apparently, not in any other way come into contact with the small-pox infection.

Influence of  
hospital on  
surrounding  
district.

The hospital premises cost 175*l.*, and the alterations, repairs, &c., a further sum of 168*l.*, or 343*l.* in all. The cost incurred in connexion with the maintenance of the hospital during the two years 1879-80 was as follows:—

Cost of  
purchase,  
alterations, and  
maintenance.

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	1878.	1879	1880.
	£ s. d.	£ s. d.	£ s. d.
Caretaker's wages ... ..	14 4 6	26 0 0	26 0 0
Nursing... ..	19 13 1	0 0 0	0 0 0
Rates and taxes ... ..	0 0 0	0 4 10½	0 9 0
Fuel and lights ... ..	8 3 6	9 11 4½	8 12 6½
Maintenance of patients ... ..	27 17 7	1 4 0*	0 0 0*
Ambulance expenses ... ..	1 12 6	0 2 0	0 1 6
Sundries ... ..	8 11 9	3 1 5	3 3 3
	80 2 11	40 3 8	38 6 3½
Repaid by patients or their friends ...	2 14 9	1 4 0*	0 0 0*
	77 8 2	38 19 8	38 6 3½

\* Only 1 patient was admitted in 1879. In 1880 some pauper children were admitted, but no separate account of their maintenance expenses has been preserved.

The original expenses in connexion with the purchase and alteration of the hospital, together with the establishment charges, were divided between the urban and rural authorities on the basis of their respective rateable values, the urban authority paying three-sixteenths and the rural authority thirteen-sixteenths of the amounts. The expenses connected with the maintenance and treatment of patients are, in those cases where the patients do not themselves refund the expenses incurred, paid for by the authority from whose district each patient comes.

SALFORD URBAN SANITARY DISTRICT.

Population in 1881, 176,233. Rateable value, 801,192*l*.

Small-pox epidemic leading to hospital provision.

Site and soil.

Hospital buildings.

The provision of a hospital for infectious diseases for the Borough of Salford was decided on early in 1876, with a view of "controlling the spread of an epidemic of small-pox, which, since the commencement of 1875, had been raging in the borough. It was not, however, until the end of 1876 when the chief virulence of the epidemic had expended itself that the hospital was sufficiently complete to receive patients."\*

The hospital, which is known as the Wilton Hospital, consists of five substantial stone-faced houses which have been altered, added to, and enclosed, in order better to fit them for the purposes to which they are put, and it is situated somewhat to the south-east of the borough at a distance of under one mile from its most populous localities. The row of houses forms a detached terrace, which is surrounded by a brick wall 8 feet 6 inches in height, and its principal means of approach is by a gateway in Cross Lane. Up to quite recently the space around the hospital buildings has been very limited and certain dwelling-houses in two adjoining streets were in actual contact with the boundary wall. During the year 1880, however, nine neighbouring houses were purchased by the Corporation, and these having been pulled down the hospital now occupies an area of some 3,700 square yards, or rather over three-quarters of an acre, and the nearest dwellings are 60 feet from the hospital buildings and 12 feet from the boundary wall. The soil is clay.

The hospital buildings consist:—1st, of the houses forming the hospital proper; 2nd, of a building containing a bath room, a "disinfecting room," and a mortuary; and 3rd, of a coach-house, stables, &c.

\* Tenth Annual Report on the Health of Salford, by John Tatham, M.D., Medical Officer of Health.



The five houses have basements with three stories above; and they all communicate with each other on the ground floor by means of an enclosed passage at the back. One house at one end of the terrace is set apart as a residence for the resident medical officer and the matron; the next one is reserved for administrative purposes and for nurses' rooms; the third is allotted to cases of scarlet fever; the fourth to cases of small-pox, or, when this disease is not prevalent, to any other cases; and the fifth, which is the largest, to cases of enteric fever. In all, nine rooms varying in size from the two principal enteric-fever wards, which have each a floor space of 961 square feet and a capacity of 10,576 cubic feet, to one which contains 233 feet of floor space and 2,097 cubic feet, are reserved as wards. This gives a total of 50 beds, the average floor space and cubic capacity per bed being about 85 square feet and 1,000 cubic feet. The two larger ward-rooms have windows in two adjacent walls, the windows consisting of double-hung sashes surmounted by a hinged sash enclosed with flanges at the sides and opening towards the ceiling; the other wards have each two similarly constructed windows in one wall only. There are also throughout the building ventilating openings just above the floor level and just below the ceiling. Each of the ward-rooms is fitted with an open fireplace having a chamber behind, from which warm fresh air passes into the room. There is a movable bath and a ward kitchen in each of the five houses, and in the enteric-fever house there is a shoot in a projecting building by means of which clothing and linen can be thrown from each floor into a tank containing a solution of carbolic acid below.

The water-closets, sinks, and bath-rooms mostly occupy projections from the main building. None of them are separated from the building by means of a cross-ventilated lobby, although as regards the water-closets and sinks such an arrangement could in almost every house be easily carried out.

The bedsteads in use are "diagonal woven wire mattress" beds, manufactured by Messrs. Gresham and Craven, of Salford; feather beds being placed on the mattresses.

The present position of the laundry is open to grave objection, being situated in the basement of the house used as the enteric-fever hospital. In this laundry is a machine for cleansing the feathers of the beds by means of superheated steam. The construction of a new laundry on the recently extended site is in contemplation.

The mortuary, and also the "disinfecting room" to which further reference will be made are, owing to the limited space available when the hospital was first established, both within 9 feet of the main body of the hospital building, an enclosed corridor, and at two points an area also, intervening. The ambulance, which resembles that used in Manchester, is fitted to receive one or two movable stretchers.

The water-supply is from the Corporation mains, and the sewage passes into the public sewers. The ventilation of the house drains and the soil pipes of the water-closets is imperfect.

The hospital had, at the date of my visit, been open during four complete years, its use having with six exceptions been limited to cases of infectious diseases arising in the borough. For some time past, however, it has been obvious that the accommodation available was quite insufficient to meet the steadily increasing demand made upon it, and hence in 1880 the Corporation made an arrangement with the Committee of the Monsall Hospital (see report on Manchester urban sanitary district) for the reception of cases from Salford into the latter hospital, which lies about  $3\frac{1}{4}$  miles from the centre of the borough. This arrangement, which secures to Salford an additional 120 beds, making in all 170 beds, came

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Laundry

Mortuary, ambulance, &c.

Water-supply and drainage.

Provision of increased hospital accommodation.

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into operation towards the end of 1880, cases having been sent from Salford to Monsall Hospital during the latter part of that year.

Admission of patients.

In the table on p. 231, which has been compiled from statistics prepared by Dr. Tatham, the Borough Medical Officer of Health, the total number of patients admitted from Salford into the Wilton and Monsall Hospitals is shown, together with the diseases under which they suffered, and the total mortality registered, both in the borough and among Salford patients dying at Monsall, from the diseases specified.

Social status of patients.

The social status of the patients is shown in the table below, which includes a total of 1,263 cases admitted from the opening of the hospital in October 1876 to the end of 1880.

Paupers	-	-	-	-	-	524
Wage-earning class	-	-	-	-	-	684
Tradespeople	-	-	-	-	-	24
Clerks	-	-	-	-	-	15
Professional class	-	-	-	-	-	16
						<hr/> 1,263 <hr/>

Admission of paupers.

The admission of paupers is not known to have affected the use of the hospital by persons in a better position. This result is, however, in the main due to the circumstance that when paupers are admitted into the Wilton Hospital, any distinctive or ragged clothing they wear is removed, and they are clothed in suits belonging to the hospital. Patients of a superior class are also, as far as possible, placed in other than the general wards. At Monsall Hospital paupers are almost invariably treated apart.

Admission of young children

I am informed by Dr. Tatham that such difficulties as were at first met with as regards the isolation of young children, are steadily on the decrease. This applies especially to the lower classes, amongst whom the Wilton Hospital has steadily acquired an increasingly good reputation. Of the 1,263 patients admitted from the opening of the hospital to the end of 1880, the ages were as follows:—

Under one year	-	-	-	-	62
One year	-	-	-	-	71
Two years	-	-	-	-	88
Three years	-	-	-	-	84
Four years	-	-	-	-	87
Five years	-	-	-	-	86
Six years	-	-	-	-	68
Seven years	-	-	-	-	55
Eight years	-	-	-	-	38
Nine years	-	-	-	-	33
Ten years	-	-	-	-	38
					<hr/> 710 <hr/>
Over ten years	-	-	-	-	553
Total	-	-	-	-	<hr/> 1,263 <hr/>

The proportion of admissions under 10 years of age is also on the increase. In 1877 40 patients were under 10 years out of a total of 174 at all ages, whereas in 1880, when the total admissions were 450, they amounted to 271 or at the rate of 60 per cent. Mothers are admitted with children in arms, and also occasionally with older children if the isolation of the latter cannot be otherwise secured.



Date.	Small-pox.		Scarlet Fever.		Diphtheria.		Typhus.		Enteric Fever and "Fever."		Measles.		Whooping Cough.		Other Diseases.		Total Admissions from all Causes.
	Deaths Registered.	Admissions to Hospital.	Deaths Registered.	Admissions to Hospital.	Deaths Registered.	Admissions to Hospital.	Deaths Registered.	Admissions to Hospital.	Deaths Registered.	Admissions to Hospital.	Deaths Registered.	Admissions to Hospital.	Deaths Registered.	Admissions to Hospital.	Deaths Registered.	Admissions to Hospital.	
1877 ...	93	113	119	10	13	1	8	0	102	31	137	1	102	0	?	18	174
1878 ...	1	0	185	70	19	1	12	11	104	78	76	53	132	1	?	20	234
1879 ...	0	2	203	157	24	1	4	4	58	31	139	62	144	8	?	42	307
1880 ...	0	2	280	199	23	2	20	64	110	71	134	54	219	17	?	41	450
1877-80 ...	94	117	787	436	79	5	44	79	374	211	486	170	597	26	?	121	1,165

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## APP. No. 1.

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Influence of  
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Results of  
isolation.

Dr. Tatham informs me that the isolation which has been carried out during the past four years has in a very marked manner prevented the spread of infection in the houses from which the patients have been removed, and to this extent it has operated beneficially for the borough generally. He cannot, however, express any opinion as to the extent of the benefit which the borough has derived, because apart from the information acquired from the death returns he has so limited a knowledge as to the amount of infectious disease which is prevalent. He hardly ever receives any notification from medical practitioners or householders as to the existence of such diseases, and although he has six inspectors of nuisances who are under his directions constantly making inquiry as to their prevalence in the different districts of Salford, he feels confident that he does not hear of more than some ten, or at the outside some fifteen, per cent. of the total cases. So also, information which he does receive, seldom reaches him at an early stage of the disease. When, however, a case of infectious disease is heard of, the house is visited, and the inspectors, who I am informed have acquired considerable influence over the lower classes, rarely fail in cases where compulsory measures could be resorted to, to induce the patients or the friends to consent to removal to the Wilton Hospital.

Cleansing and  
disinfection of  
houses, &c.

The room or rooms which have been occupied by the patient in the affected house, are stripped of their wall paper, they are fumigated by the evolution of chlorine gas, and the walls, floor, and ceiling are "dressed" with a strong solution of caustic soda. A charge was originally made for these various processes where it was thought that the householders were able to pay, but latterly the Corporation have felt that the sanitary interests of the borough were best served by making no charge. All these measures are therefore now carried out at the public cost, six "limewashers" being employed for the purpose. A copy of one of the forms used by the Inspectors of Nuisances in reporting cases of infectious diseases is appended to this report. (Form A.)

Disinfecting  
stove.

Until recently the clothing and bedding from infected houses were also taken to the hospital and there dealt with in a "Nelson's stove." This apparatus, however, has been abandoned, not only because a considerable number of articles were every now and again scorched and even completely destroyed in it, but because it was, according to Dr. Tatham and a former resident medical officer, found "impossible to subject clothes," &c. "to any definite temperature" in the apparatus, there being "no constant relation between the temperature as indicated by the external thermometer and that actually registered by an instrument placed inside the article to be disinfected." The temperature indicated by the thermometer fixed in the stove when articles were scorched is stated never to have exceeded 180° Fahr. Up to the present time no other disinfecting apparatus has been procured, and hence such things as cannot be "fumigated" are, as a rule, burned in a "destructor" kept in one of the Corporation yards.

Prevention of  
infection  
through  
elementary  
schools.

Recently Dr. Tatham has issued postcards addressed to himself, to the masters and mistresses of all elementary schools, on which to report to him the absence of any pupil who is suspected of suffering from any infectious disease, and as far as can be judged from the short time they have been in use, the plan is likely to take an important place amongst the measures adopted for the prevention of the spread of infection both in the schools and in the borough generally. So also whenever Dr. Tatham hears of a case of infectious disease in a house containing children who attend any such school, he has for several years past, at once communicated the fact to the schoolmaster or mistress on a form which is appended to this report (Form B.), and which suggests that no



pupils from the address named should be allowed to attend school until the premises in question have been certified as free from infection. This action has, I am informed, in many marked instances prevented the spread of infection amongst school children.

No action has ever been taken in Salford to secure the removal of a patient to either the Wilton or the Monsall Hospital under section 124 of the Public Health Act, 1875. In all instances to which the section would have been applicable, or in which information as to the existence of infectious disease has been received sufficiently early to justify the removal of the patient to hospital, either persuasion has sufficed, or the sick have been paupers, and have as such been removed under an order of the Guardians.

A charge of 10s. 6d. per week has hitherto been made by the Sanitary Authority for the maintenance and medical attendance whilst in hospital, and formerly considerable efforts were made to recover the amount. But as the majority of the patients are derived from the lower and the working classes who, as a rule, lose their occupation owing to the illness for which they are isolated, and since it was found that the debt due often pressed hardly upon them, and could at times only be paid by weekly instalments of either 1s. or 6d., the demand for repayment from the wage-earning classes has all but ceased, and no action has ever been taken under section 132 of the Public Health Act, 1875, for recovery of any amounts due. Many of the patients admitted, although not in receipt of relief from the Guardians, are in reality destitute when illness affects them or their families, and it has more and more become the practice of the Sanitary Authority to isolate such cases at the public cost with a view to the protection of the public health, without requiring any order of the relieving officer. But when patients are sent to hospital by the Guardians they are paid for at the rate of 1l. 1s. a week. This sum, however, does not cover the cost incurred by the Sanitary Authority, who estimate that during the past few years the cost per patient, exclusive of interest on original outlay, has amounted to about 30s. a week. The charge for patients requiring a private room is from 2l. 2s. to 3l. 3s. a week.

Dr. Tatham has the general and medical administration of the Wilton Hospital with the title of Medical Superintendent, but on one occasion only has he received any remuneration for the duties performed. A resident medical officer has also been appointed to the hospital, and private medical practitioners are not allowed to take any part either by consultation or otherwise in the treatment of the patients. It is known that this arrangement tends to exclude a number of patients who would willingly enter the hospital if they could there retain the services of medical practitioners of their own choice, and it is further believed that patients who might otherwise assent to removal from their homes, have, acting on the advice of their medical attendants, often refused to go to the hospital. The hindrance to isolation due to this cause is admitted to be by no means inconsiderable, and it has hence more than once been considered how far the co-operation of outside practitioners in the treatment of patients could be entertained, but it has always been felt that any such arrangement would so seriously interfere with the hospital administration, that it has hitherto not been sanctioned.

The original cost of the Wilton Hospital amounted in all to 14,135l. 8s. 6d. The site and the five houses cost 2,620l. 0s. 6d., the numerous additional alterations, &c. amounted to 9,494l. 0s. 9d., and the furniture and fittings to 2,021l. 7s. 3d. The recent purchase of additional land and houses at the back of the hospital, and the expenses

APP. No. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne

Public Health Act, 1875. s. 124.

Repayments by patients. Public Health Act, 1875, s. 132

General and medical administration

Cost of purchase and construction.

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connected with its being enclosed, have amounted to a further sum of 4,299*l.* 3*s.* 11*d.*

The total expenses incurred in the maintenance of the hospital during the two years 1879-80 has been as follows :

Cost of main- tenance.	1879.			1880.		
	£	s.	d.	£	s.	d.
Salaries—Resident medical officer ... ..	100	0	0	100	0	0
„ Matron ... ..	60	0	0	60	0	0
Wages of nurses, porters, &c. ... ..	569	17	2	504	18	2
Rates, taxes, and insurance ... ..	197	0	0	197	0	0
Coal, gas, and water ... ..	383	16	3	330	0	0
Meat, provisions, and groceries ... ..	1,030	19	9	1,084	19	4
Medicine ... ..	116	10	1	228	19	0
Stimulants ... ..	168	11	6	125	8	11
Disinfectants ... ..	2	19	0	4	19	0
Clothing ... ..	9	4	6	12	7	6
Repairs ... ..	115	3	5	135	12	6
Provender, &c. ... ..	39	17	4	38	16	1
Printing, stationery, and advertising ... ..	30	3	1	11	0	3
Collecting hospital charges ... ..	24	18	9	36	14	2
Cleaning materials and sundries ... ..	156	14	0	146	3	4
Total ... ..	£2,995 14 10			3,017 6 11		

Influence of  
the Wilton  
Hospital on the  
surrounding  
neighbour-  
hood.

To the east and south of the Wilton Hospital are open spaces, 340 feet and 170 feet respectively in breadth; to the west the premises abut on Cross Lane, and lie within about 70 feet of some houses on the western side of that thoroughfare; and to the north are the houses on the eastern side of Cross Lane, and also the houses forming Wilton Place and Myles Street, both thoroughfares running in a northerly direction from the hospital boundary, and being somewhat thickly inhabited by the working classes. The end houses on the eastern side of Cross Lane, and those in the two other streets named, were until 1880 in actual contact with the northern boundary wall of the hospital, and only a few feet from the nearest portions of the hospital buildings, there being immediately behind those buildings a rectangular group of 46 dwellings.

When small-pox was under treatment in the Wilton Hospital, in 1877, some few cases of that disease occurred in this group of houses; and although it was not suggested that they were due to infection spread from the hospital, the disease being at the time somewhat widely prevalent in the borough, yet Dr. Tatham made inquiry as to any possible influence which the hospital might have had in leading to the disease. He was, however, quite unable to detect any such influence, although at that date the boundary wall enclosing the hospital premises to the north had not been erected. Since this occurrence, also, the possible influence of the hospital for harm in the neighbourhood in which it is situated has been carefully watched, the result being that no instance is known in which the occurrence of any infectious disease has either been attributed to, or has been traced to, the hospital.



FORM A. (The colour of the Form is different in each of the six Districts into which Salford is divided for the purpose of the Inspectors of Nuisances.)

APP. No. 1.  
—  
On the Use and  
Influence of  
Hospitals for  
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Dr. Thorne.

INFECTIOUS DISEASE—PENDLETON DISTRICT.

Source of information \_\_\_\_\_

Name of patient \_\_\_\_\_

Age \_\_\_\_\_

Address \_\_\_\_\_

Ward

Disease

Condition of patient \_\_\_\_\_

Date when taken ill \_\_\_\_\_

Probable cause of disease \_\_\_\_\_

No. of previous cases within month \_\_\_\_\_

School attended \_\_\_\_\_

Date and mode of disinfection\_\_\_\_\_

Rooms requiring limewashing { Upstairs \_\_\_\_\_  
Downstairs \_\_\_\_\_

Bedding to be stoved \_\_\_\_\_

" " destroyed \_\_\_\_\_

Nuisances requiring removal \_\_\_\_\_

## FORM B.

General Health Department, Salford,

188 .

THE Sanitary Inspector for your district reports that *Scarlet Fever* is present at No. \_\_\_\_\_ *Street*, which I am informed is the residence of A.B., one of the pupils in attendance at your school.

I would suggest, in the interest of the public health, that you should not receive into your school any pupils from this house until it has been certified free from infection.

I am, yours faithfully,

JOHN TATHAM, M.D.,

Medical Officer of Health.

To the School [*master or mistress*]  
of \_\_\_\_\_ School, Salford.

## SCARBOROUGH URBAN SANITARY DISTRICT.

Population in 1881, 30,484. Rateable value, 142,553*l.* 1*s.* 0*d.*Origin of  
hospital.

Site.

In 1871 small-pox became prevalent in Scarborough, and a hospital was erected with a view to the isolation of the patients. The site of the building is a piece of land of irregular shape, measuring 300 feet in length, and having a mean width of about 50 feet; it is situated on a principal highway within the borough, but in a fairly isolated position outside, and to the north-west of the inhabited portion of the town. The hospital buildings stand over 80 feet from the road. Although there would not appear to be any difficulty in making a proper and reasonably attractive approach direct from the roadway through the land fronting the hospital, the present approach is first through a stone-yard belonging to the Corporation, and then behind the Borough Gaol, which adjoins the hospital.

Hospital  
buildings

The hospital buildings consist of one ward-pavilion, with a detached administrative block, and certain outbuildings. The pavilion has 9-inch brick walls and a slate roof, which is not ceiled inside. Occupying the centre of the pavilion are a nurses' room, which is not provided with windows commanding a view of the wards, a store-room, a bath-room containing a fixed bath, an entrance lobby, and a passage communicating between two wards, which occupy either end of the pavilion. The wards are in direct communication with each other by means of a space intervening between the ceiling of the central offices and the roof, and the hospital is therefore adapted only to receive at one and the same time one infectious disease in patients of both sexes. Each ward contains 10 beds, and is 58 feet in length, 24 feet in width, with a mean height of about 16 feet. There are, therefore, for each bed 139 superficial feet and 2,227 cubic feet. The wards are well lighted and well ventilated; they both have eight windows, four in each opposite wall, thus securing a cross current of air; there are also louvred openings above each window, and along the ridge of the roof. There is, however, only one open fireplace at the end of each ward, and it must hence be impossible to maintain an equable temperature in cold weather. The closets, beneath the seats of which pails are fitted, are faulty; they open directly into the wards and are very inefficiently ventilated. There are no lavatories or slop sinks. Inside the pavilion the brick walls and the slates of the roof are merely whitewashed, and the general appearance of the wards is by no means attractive. The administrative block is joined to the wards by means of a roofed passage entirely open at the sides. It merely contains a kitchen, a pantry, and a coal store, there being no accommodation for nurses beyond the single chamber in the ward pavilion. The town water is laid on to the premises, and the drainage passes into the public sewer, no direct communication existing between the interior of the buildings and the drains. An ambulance, consisting of a van which has been lined with zinc, and which also serves for the removal of infected bedding and other articles, is kept in a shed in a detached yard belonging to the Corporation.

Admission of  
patients.

In 1871 and 1872 some 40 cases of small-pox were treated in the hospital, but since that date no patient has been received into it. Since the opening of the hospital the following deaths have been registered in Scarborough:—



DEATHS from SPECIFIED CAUSES in the Urban Sanitary District of  
Scarborough in the 8 years, 1872-9.

APP. No. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Date.	Small-pox.	" Fever."	Scarlet Fever.	Diphtheria.
1872	35	8	—	1
1873	—	3	3	3
1874	—	4	7	1
1875	—	16	5	2
1876	2	3	4	5
1877	—	3	9	1
1878	—	7	11	2
1879	—	11	1	—
1872-79	37	55	40	15

There would thus appear to have been no lack of cases in which isolation would have been advantageous if not imperatively needed, especially as Scarborough is a town where, during a part of the year, so many persons are resident in lodgings. I am, however, informed by Dr. J. W. Taylor, Medical Officer of Health, that many of those attacked with infectious diseases have been persons, including sailors, who on sickening became paupers, and as such were removed to the infectious wards at the workhouse which is situated within the borough, and that the remainder, who were in no instance persons "without proper lodging and accommodation," had always refused to be removed to the hospital when such a measure had been proposed to them. This might have been otherwise in the case of a building less comfortless in appearance, and having different means of approach.

The site on which this hospital stands is Corporation property; the building cost 546*l.* 18*s.* 4*d.*, and the amount spent on fittings and furniture was 148*l.* 11*s.* The expenses incurred in the maintenance of the buildings includes, 1<sup>o</sup>, 3*s.* a week to a woman who regularly visits the hospital to keep it clean and aired, and who is expected to take charge of any patient brought in until a trained nurse has been procured; 2<sup>o</sup>, a small amount of fuel; 3<sup>o</sup>, rates and taxes; and 4<sup>o</sup>, certain occasional repairs. During the two years ending respectively March 1879 and 1880, the amounts so spent reached 8*l.* 2*s.* 1*d.*, and 10*l.* 3*s.* 10*d.*

Cost of construction, &c.

The Disinfecting Apparatus hitherto in use at Scarborough is a chamber containing a Nelson's stove, and it has been somewhat largely used; thus, in the four years 1876-79, bedding and other articles from 197 infected houses have been dealt with in it. It has, however, often happened that when the temperature indicated by the thermometer fixed in the stove has only reached from 150° Fahr. to 160° Fahr., articles have been so much scorched that the Sanitary Authority have been obliged in some way to compensate the owners. This result has been noticed when the articles in question were carefully kept from the sides of the stove by means of a wooden framework; the process of heating having been carried out under Dr. Taylor's personal supervision. The Authority have recently purchased one of the self-regulating stoves manufactured by Messrs. Goddard and Massey, of Nottingham.

Disinfecting apparatus.

There are two mortuaries in Scarborough. One was constructed by the Corporation on whose premises it stands. It is a substantial brick building, fitted with all the conveniences necessary for the purposes of post-mortem examinations. Hitherto it has only been used for the reception of the bodies of persons either found on the beach or dying in common lodging-houses. The other mortuary is situated in the cemetery,

Mortuaries.

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and is only adapted to the temporary reception of the dead in coffins. It has been found very useful in the case of persons dying in the better class of lodging-houses in the town.

#### SETTLE RURAL SANITARY DISTRICT.

Estimated population in 1880, 15,500. Rateable value, 122,231*l*.

Temporary  
cottage  
hospital.

Temporary use  
by Sanitary  
Authority of  
the workhouse  
infectious  
hospital.

Transfer of  
workhouse  
hospital to  
Rural Sanitary  
Authority.

Hospital site.

Hospital build-  
ings.

In July 1878 enteric fever, which had earlier in the year caused some isolated attacks in several parts of the rural district, became prevalent at Langcliffe and spread into Giggleswick and Settle. A cottage just outside Langcliffe being placed at the disposal of the Sanitary Authority they at once fitted it up as a temporary hospital, and having procured a nurse, it was with but little delay occupied by patients. The disease, however, continued to spread, and in view of the emergency the Guardians on August 10th handed over the hospital for infectious diseases situated in the grounds of the Settle Union Workhouse at Giggleswick to the Rural Sanitary Authority. The building was at once made ready and occupied by patients, the use of the cottage at Langcliffe being in the meantime discontinued. By these means 42 patients were isolated before the end of November and 1 in December, after which the epidemic ceased. The original outbreak had indeed subsided in October, but a second prevalence ensued, owing to some fresh cases which were not reported to the Sanitary Authority being treated at their own homes. The success attending this use of the workhouse hospital for infectious diseases led to an application being made to the Local Government Board by the Guardians for permission to transfer the hospital to the Rural Sanitary Authority. Local inquiry was made, and having regard to the circumstances of the case the transfer was sanctioned early in 1879, subject to certain conditions which the Rural Sanitary Authority undertook to carry out with a view of adapting the hospital to the requirements of their district and of completely isolating it from the workhouse premises. Some delay occurred in the complete fulfilment of these conditions owing mainly to the circumstance that the hospital continued to be used for the reception of isolated cases of infectious diseases, but they have since then been carried out under the immediate supervision of Dr. F. W. Barry, until recently Medical Officer of Health for the combined Craven district in which Settle is situated.

The Giggleswick Hospital, as it is now styled, occupies a piece of land somewhat under three-quarters of an acre in extent, and is shut out from the spacious workhouse grounds in which it formerly stood by means of a substantial stone wall some 8 feet in height. The nearest workhouse building is a by no means unattractive detached infirmary about 40 feet distant. The hospital is approached by a separate entrance from the main road adjoining. It occupies a position to the extreme south-west of the village of Giggleswick, where it commands an extensive and picturesque view of the valley of the Ribble. The building is situated somewhat to the south of the centre of the rural sanitary district, but a considerable portion of the north is mountainous and all but uninhabited. Hardly any populous village is more than about 5 miles distant, and by far the largest and most populous places are much nearer. Settle itself is three-quarters of a mile away. The entire district has an area of 151,942 acres, and an estimated population of 15,500.

The hospital buildings as now altered consist of a two-storied hospital and two groups of outbuildings, all being of stone. In the centre of the hospital are the rooms reserved for administrative purposes, namely, a nurse's day room and a kitchen on the ground floor, and two nurses' bedrooms on the upper floor. On either side of the central portion is a



well-ventilated entrance hall, the two sides of the building, which are in every way similar, thus having separate entrances. Beyond these entrances on either side are: 1st. On the ground floor; one ward measuring 20 ft.  $\times$  16 ft.  $\times$  11 ft., and having a capacity of 3,520 cubic feet; a second ward opening out from the first, measuring 20 ft.  $\times$  12 ft.  $\times$  11 ft., and having a capacity of 2,640 cubic feet. This latter ward can, however, be shut off from the first, as it has a separate entrance lobby at the end of the building. On either side of the lobby are small rooms, the two at one end of the building being fitted up as a medical officer's room and as a dispensary, those at the other end as a linen-closet and a bath-room. 2nd. On the first floor there is one ward only on either side of the building, and it is of the same capacity as the larger ward on the ground floor. There is thus accommodation for the simultaneous treatment of two different infectious diseases occurring in both sexes, the total number of beds being 10. Opening out from the entrance halls on either side of the central administrative rooms the Rural Sanitary Authority have erected projecting buildings on each floor. These contain the water-closets and slop-sinks, both being separated from the main building by a cross-ventilated lobby. Movable baths are supplied on both floors. There are two groups of outbuildings; one immediately behind the hospital has been converted into a pantry, a coal and wood store, and a store room for disinfectants; the other is a substantial new stone building, standing at the extreme south of the hospital grounds, and it consists of a wash-house and laundry, a disinfecting stove, an ambulance shed, and a mortuary which is fitted for the purposes of a post-mortem room.

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The disinfecting stove consists of a solid vaulted brick chamber, 12 feet long and 9 feet in breadth, situated inside the stone building; it is closed by a well-fitting iron door, and is fitted with open trellis shelves of teak. Below is a furnace, the heat from which is conveyed into the chamber by means of five flues opening out on the floor level. The only opening by which moisture can be got rid of is a small one, through which a registering thermometer is thrust. The stove, which is similar to the one in use at Oldham, is stated to work efficiently, but no experiments appear to have been made to ascertain how far the temperature penetrates articles such as beds, &c.

Disinfecting  
stove.

The water-supply is derived from a spring on Giggleswick Scars, a constant service both of hot and cold water being conveyed to all parts of the building. The hospital drains have been diverted from the work-house drains, and have a separate junction with the main sewer in the road. They appear to have been laid with great care. At every junction a ventilating man-hole has been constructed, a separate ventilating shaft has been placed at the highest and the lowest points of its course, and at the head is a flushing tank holding some 300 gallons. There is no direct communication between the drains and the interior of any of the buildings; the rain-water pipes are disconnected below, and the soil pipes, which are carried up in their full diameter above the hospital roof, are both trapped from the drains and provided with means by which a constant current of air through them is insured.

Water-supply  
drainage, &c.

The hospital grounds were being laid out at the date of my visit in such a way as to enable patients suffering from two different diseases to take recreation without mingling.

Recreation  
grounds.

In short, the Rural Sanitary Authority have in every respect carried out the conditions subject to which the building was transferred to them, and they have evidently aimed at doing this in such a manner as to make the hospital efficient and attractive.

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Influence of  
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Advantages of  
isolation.

At the date of my visit the hospital was not in use. The structural alterations had only recently been completed, and the furniture and bedding which had been ordered to take the place of that which formerly belonged to the workhouse, and which it was not thought advisable to retain, had not yet been received.

The use to which the hospital has been put since it was formally transferred to the Rural Sanitary Authority has necessarily been very limited. It has, however, been most satisfactory in its results. Thus in the second quarter of 1879 scarlet fever broke out in Settle. Three young children who were affected with the disease were at once admitted together with their mother, and after disinfection both of premises and clothing, two elder children, who were the main bread-winners of the family, were allowed to resume their work at a neighbouring mill. No further spread took place, whereas in several adjoining sanitary districts having no means of isolation scarlet fever at about the same date became widely prevalent.

The majority of the patients hitherto admitted have come from the families of mill hands, railway servants, and small farmers; some have also been domestic servants.

Admission of  
paupers.

One of the conditions under which both the temporary and permanent transfer of the hospital to the Rural Sanitary Authority was made, was that paupers were, whenever necessary, to be admitted. This has been carried out, and although both this and the situation of the hospital with regard to the workhouse buildings led to some inquiries on the part of patients during the epidemic of enteric fever in 1878, yet an explanation to the effect that the building and its administration were in the hands of the sanitary and not the poor-law authority, in every case suffice to remove all objections raised both prior to and after removal. Paupers are, however, not admitted in pauper dress.

Public Health  
Act, 1875, s. 124.

In two instances compulsory removal to hospital has been effected under section 124 of the Public Health Act, 1875. The first occurred during the earlier part of the outbreak of enteric fever at Langcliffe, when the hospital cottage was in use, and the objection to removal was solely based on an erroneous rumour which had been spread to the effect that the cottage was not fit for the occupation of patients. The second took place when the present hospital was being temporarily used by the Sanitary Authority. In both instances the removal was quietly submitted to as soon as the orders had been procured.

Repayments  
by patients.

The Sanitary Authority, having regard to the desirability of facilitating to the utmost the early isolation of cases of infectious diseases, have not in any case deemed it desirable to ask for any repayment on account of maintenance and medical attendance in the hospital, but in certain cases owners of mills and gentlemen have paid for the actual medical attendance of their employés or servants.

Administrative  
and medical  
attendance.

The general administrative charge of the hospital has been in the hands of Dr. Barry. Patients are allowed to select their own medical attendant, and if they are unable to pay his fees, the Sanitary Authority pay the sum of 2s. 6d. per visit to any registered medical practitioner so selected or they themselves provide medical attendance. The paupers admitted have hitherto been attended by the workhouse medical officer.

No permanent staff is as yet maintained at the hospital. The care of the buildings and furniture is in the charge of the Inspector of Nuisances, and nurses are procurable at about an hour's notice from several of the neighbouring large towns.

The expenses incurred by the Rural Sanitary Authority in converting the hospital to their uses are as follows:—



	£	s.	d.	APP. NO. 1.
Alteration of existing building and erection of new buildings; building a wall; laying out grounds, &c.	736	0	0	On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.
Furniture and fittings	200	19	1	
Expenses in connexion with the purchase and erection of the disinfecting apparatus	124	3	5	Cost of alterations.
	£1,061	2	6	

SHEFFIELD URBAN SANITARY DISTRICT.

Population, estimated in 1881, 285,621. Rateable value, 934,320*l*.

The construction of a hospital for infectious diseases for the borough of Sheffield was finally determined on in 1877, and on the occasion of my visit towards the end of 1880 the buildings were just completed.

The site, which was purchased by the Corporation in 1876, consists of a quadrilateral piece of land measuring somewhat over an acre and a third, and occupying the summit of one of the numerous undulations which characterise Sheffield. It lies nearly 400 feet above Ordnance datum, and is situated about 400 yards from the centre of the borough, which covers an area of some 30 square miles. The soil is clay. Originally the surface was very irregular and presented a rapid fall towards the north-east. With the exception, however, of about one-fifth of the whole, the site has at a considerable cost been levelled. The raised portion consists of 5,346 square yards, the lower part of 1,349 square yards. The main approach is from the south-west, where the site adjoins Winter Street and overlooks Weston Park on the opposite side of the street. To the south-east lie the grounds and outhouses of a private residence styled West Grove, and also some houses in West Grove Square; the latter houses have, however, no windows looking towards it. To the north-west the site forms one side of Mushroom Lane, the other side being occupied by houses, several of which have been erected since the building of the hospital was commenced. To the north-east it adjoins the yards of some back-to-back houses in Summer Street, and it comes also into contact with about half-a-dozen single houses, the windows of which all look towards Summer Street.

The raised portion of the site is level with Winter Street, but it stands at a considerable elevation above the other neighbouring streets. On this raised portion are an administrative block, and four detached ward pavilions; porter's lodge will also be erected on it. The lower portion of the site has a separate entrance from Mushroom Lane, and on it are built a laundry with ironing room and drying room, a disinfecting chamber, a mortuary and post-mortem room, an ambulance shed and stabling.

The Corporation having offered prizes for hospital plans, and having consulted Captain Douglas Galton as to those which were sent in, selected the designs of Mr. S. L. Swann, architect, of Sheffield, under whose personal superintendence the works have been carried out.

The administrative block occupies the extreme north-eastern extremity of the raised portion of the site, and it faces the south-west. To the front it is a three-storied building; at the back, and at a lower level, are two other stories overlooking the lower area of the site. It is a substantial red brick and stone building, the outer walls of which are

Hospital buildings.

18 inches in thickness. On the ground floor are the resident medical officer's and the matron's sitting rooms, a nurse's sitting and dining room, a kitchen, a scullery, and store-rooms.

On the first floor are eight bed-rooms, for the resident medical officer, the matron, nurses, and staff, two bath rooms, and a store room for linen, &c. On the second floor are two more bedrooms.

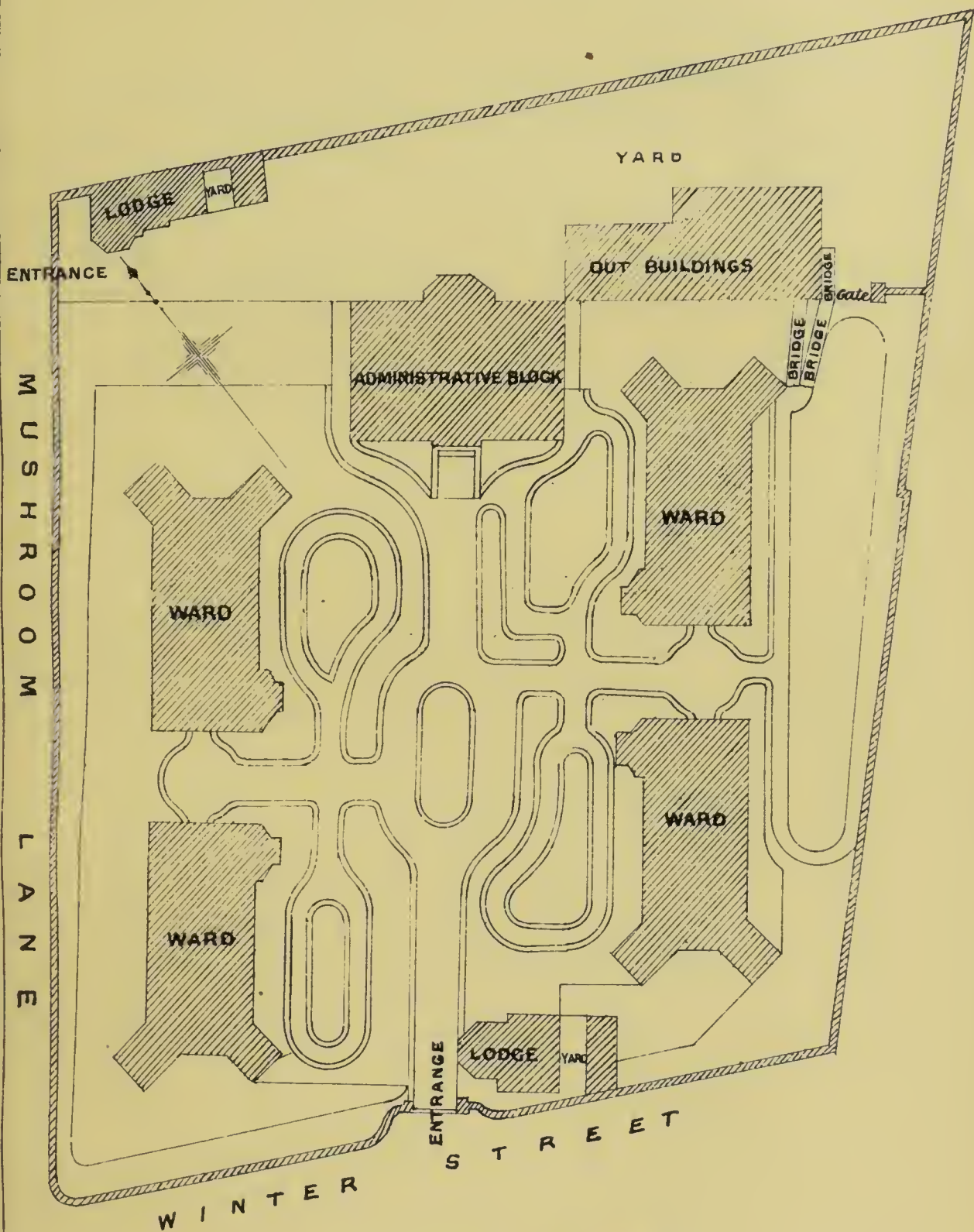
The ward pavilions, which are alike in point of construction, lie two on either side of the site, their ends being about 30 feet apart. The sides of the pavilions face Mushroom Lane to the north-west, and West Grove to the south-east, a distance varying from 23 feet to 43 feet intervening between them and the boundaries of the site. An open space, 100 feet in width, and covering some 2,000 square yards, occupies the centre of the site. (See Plates Nos. XXXI. to XXXVI.)

Like the administrative block, the ward pavilions are of red brick with stone ornamentation; they are two-storied buildings, substantial and elegant in appearance, and have their outer walls 18 inches in thickness. Beneath each pavilion the clay has been removed to a considerable depth, and the foundations rest on somewhat massive stone walls and piers. At one end of the pavilion, and on the ground floor, is a lobby and entrance hall having a nurse's room on one side and a "convalescent room" on the other; on the first floor, and occupying a similar position, are a nurse's room and another small apartment; the nurse's rooms being each fitted with a kitchen range and having a fixed window commanding a view of the ward adjoining. There is one ward on each floor, and they are in every respect alike. Each ward is rectangular at the end nearest the entrance, but at the outer end the angles are cut off by the projecting water-closets, &c. The extreme length is 42 feet 6 inches, the width is uniformly 26 feet, there being a floor space of about 1,100 square feet. In height the wards are 13 feet 2 inches, the total ward capacity being 14,500 cubic feet. Eight beds will be placed in each ward, those on the ground floor being intended for males, those on the first floor for females. Each bed will hence have 138 square feet, and 1,810 cubic feet. There will thus be 16 beds in each pavilion, or 64 in all. There are five windows in each of the opposite side walls of the wards, with an additional one at the end facing the entrance, and they are so arranged that there is one near each corner of the ward. The lower three-fourths of each window consists of double-hung sashes, and the upper quarter of a pivot-hung frame which easily opens by means of Beanland's patent quadrant. The total window area in each ward is 279 square feet, or at the rate of one square foot to every 56 cubic feet. The beds will occupy the wall spaces between the windows. Above each bed space are fitted two Sherringham ventilators having direct communication with the outer air by means of shafts rising from below. At the further end of each ward, and running at an angle of 45 degrees from the main building, are two projecting buildings. One contains lavatories and a bath room, the bath being so fixed that attendants can stand at either side of it; the other contains two water-closets and a slop-sink, themselves ventilated by means of opposite windows, and separated from the ward by means of a lobby also provided with cross ventilation.

The ward ceilings are flat and there are nowhere any projections favouring the accumulation of dust, the walls are of cement and will be coloured with some wash which can be frequently renewed. The floors consist of pine planks laid without any interspaces. The remainder of the wood work throughout the buildings is of oak. The centre of each ward is occupied by a large stove containing two open fireplaces.



HOSPITAL FOR INFECTIOUS DISEASES, SHEFFIELD.



BLOCK - PLAN

SCALE OF FEET

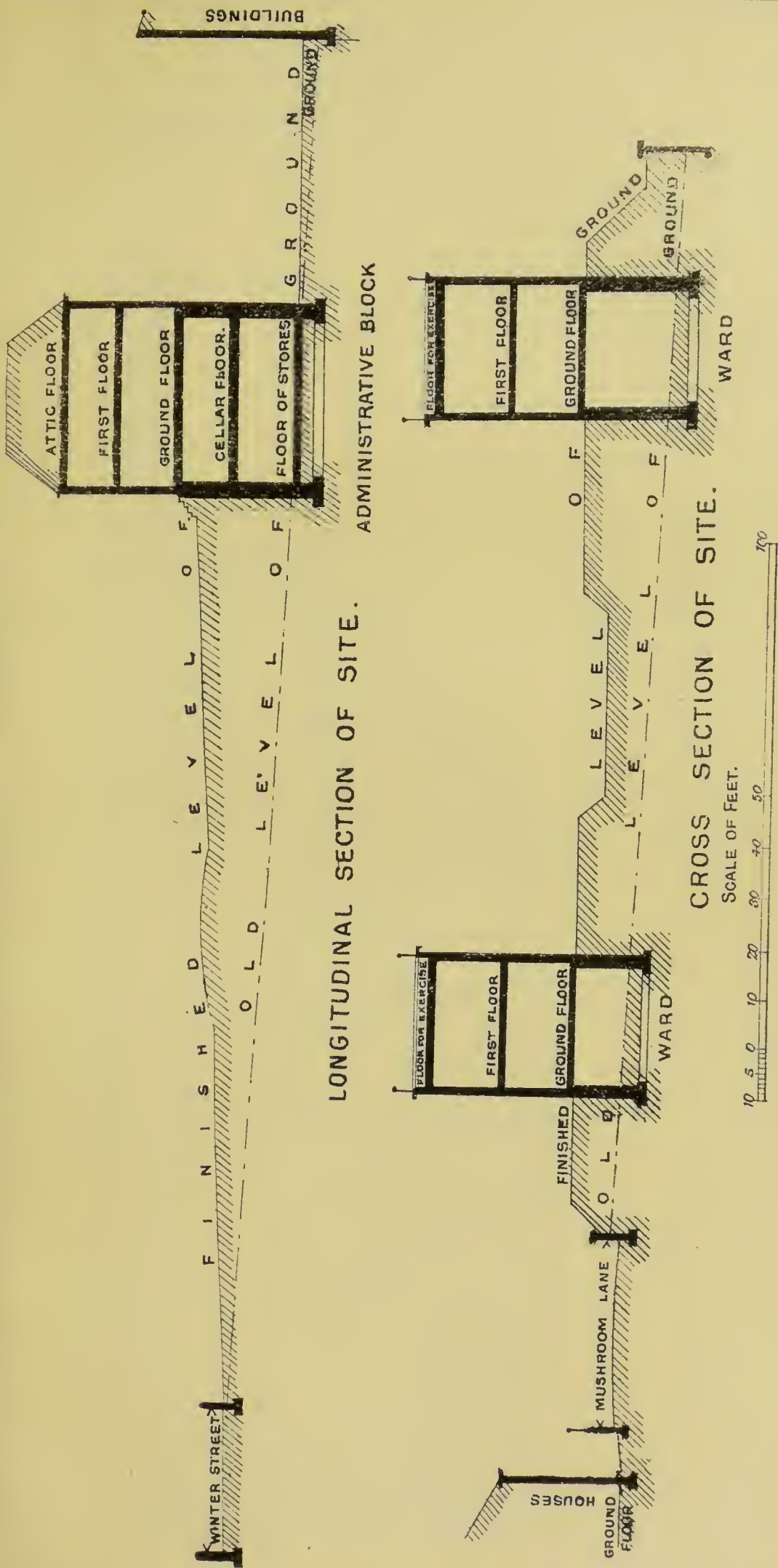


*S. L. Swann Archt.  
Sheffield Dec 16<sup>th</sup> 80.*





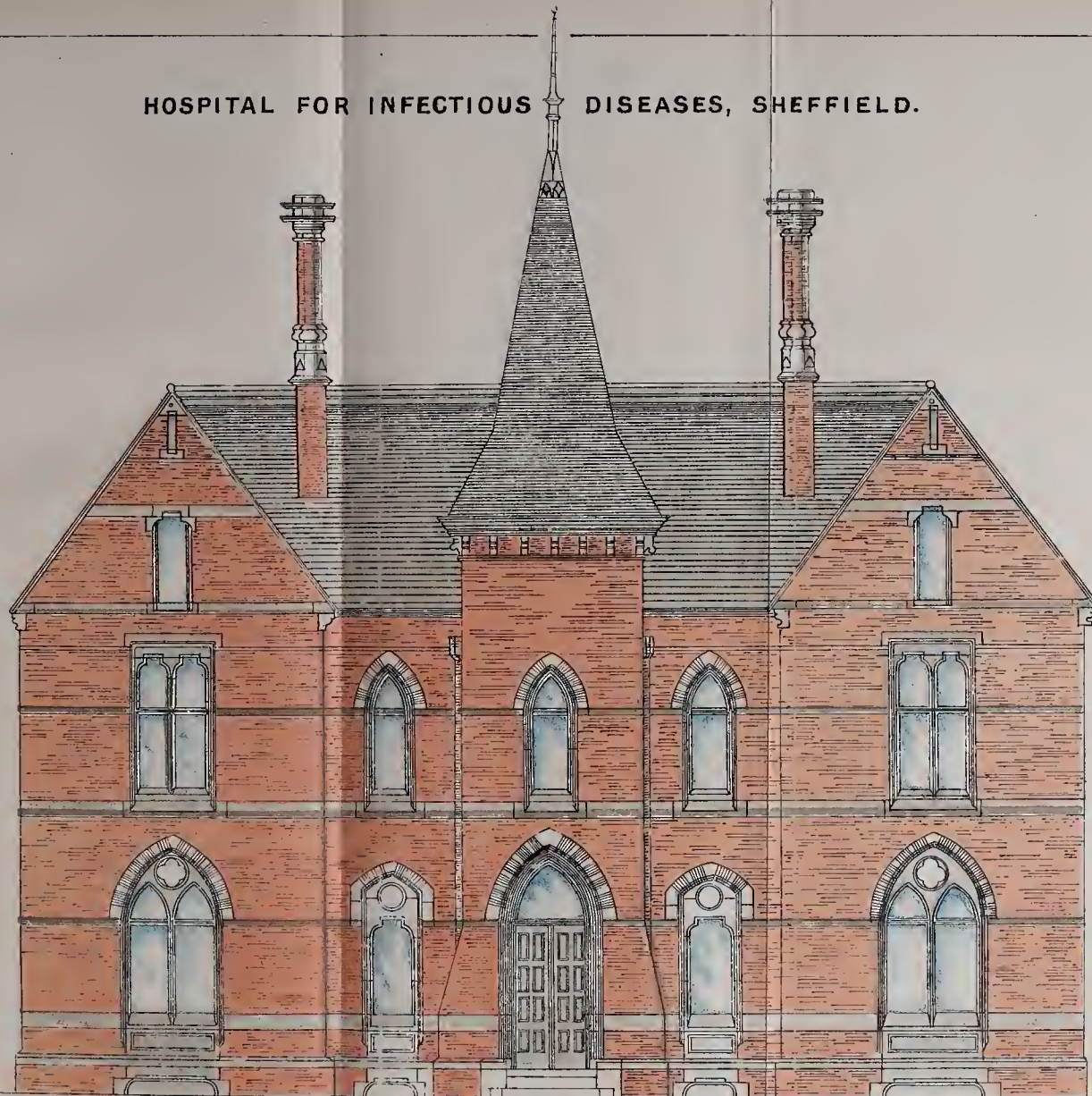
HOSPITAL FOR INFECTIOUS DISEASES, SHEFFIELD.







# HOSPITAL FOR INFECTIOUS DISEASES, SHEFFIELD.



ELEVATION

10 5 0 20  
SCALE OF FEET.

*S.L. Swann Archt.  
Sheffield, Dec. 16<sup>th</sup> 80.*





# HOSPITAL FOR INFECTIOUS DISEASES SHEFFIELD.



GROUND PLAN

SCALE OF FEET.



S. L. Swann Architect  
Sheffield, Dec. 16. 80.





# HOSPITAL FOR INFECTIOUS DISEASES, SHEFFIELD.



ELEVATION.

SCALE OF FEET.

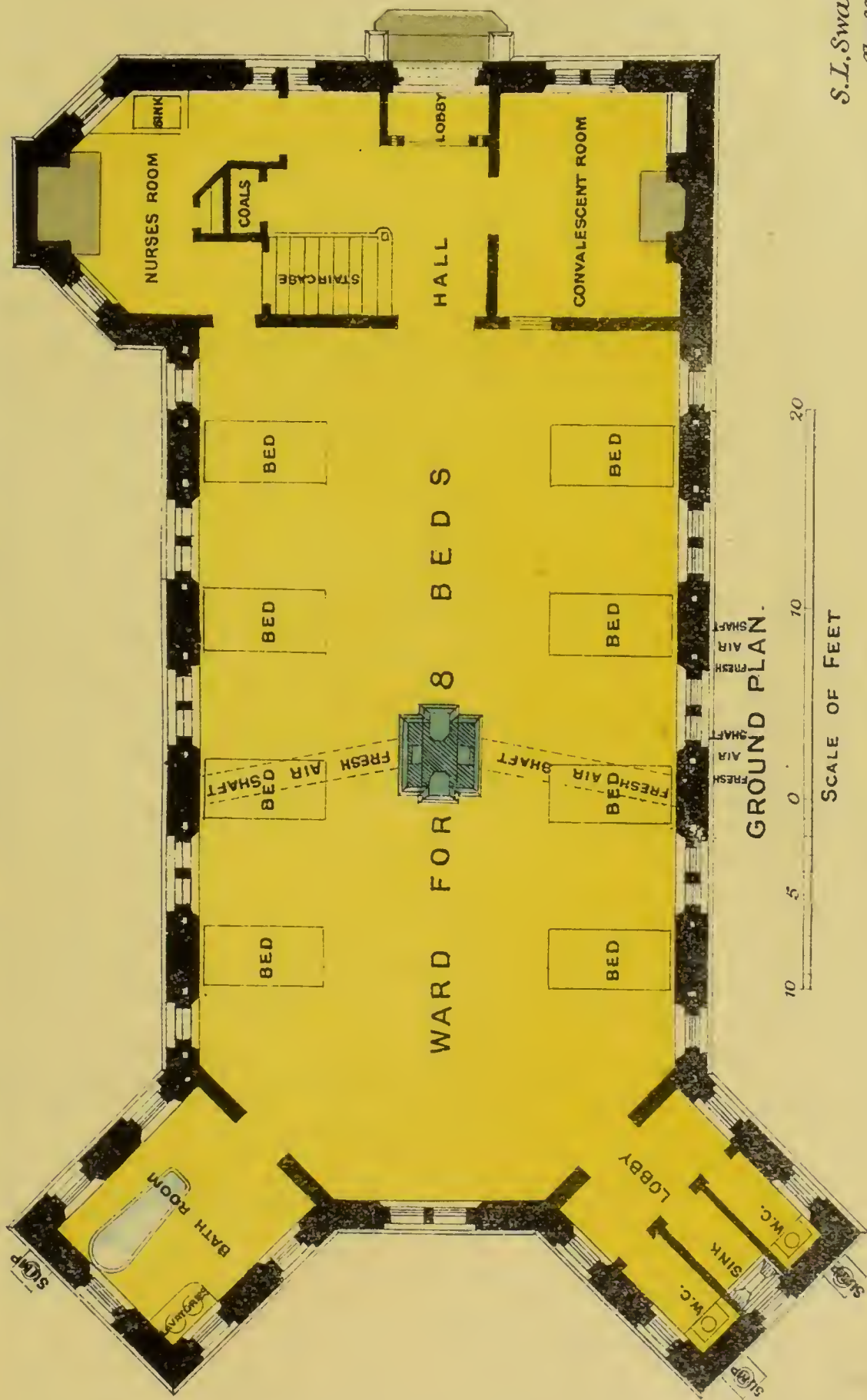


S. L. Swann, Archt:  
Sheffield Dec. 16<sup>th</sup> 80





S.L. Swann Architect  
Sheffield, Dec. 16<sup>th</sup> 80.







Fresh air, which is conveyed from without by means of special shafts under the floor on each side of the ward, passes round the fireplaces, and after being warmed, into the wards, at a height of about 6 feet above the floor. Another opening near the ceiling carries some of the vitiated air into the smoke flue. These stoves appear fully to answer their intended purposes.

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There is a constant service of water to all parts of the building from the Corporation mains. The drainage is into the town sewers. All waste pipes and overflow pipes discharge in the open air; all soil-pipes are carried up above the roofs of the projecting buildings in which they are placed and they are so arranged as to admit of a constant current of fresh air through them.

Water-supply  
and drainage.

The amount of recreation ground available for patients is very limited: the more so as it will be necessary, in order to prevent communication with persons outside, to erect barriers which will prevent the patients from passing beyond the space enclosed by the several pavilions. With a view of lessening this drawback as much as possible, Mr. Swann refrained from erecting a pitched roof as originally designed, and in its place he has constructed on each pavilion a flat roof which is enclosed by a stone parapet surmounted by a light iron palisade, and which is easily reached by means of an easy staircase. In this way some 550 square yards of additional airing ground are secured, in a position where an attractive view over Weston Park and a neighbouring valley is obtained. By this arrangement also the mingling of convalescent patients suffering from different diseases will be the more easily prevented.

The disinfecting stove which has been provided is one of the kind designed by Dr. W. H. Ransom and manufactured by Messrs. Goddard and Massey, of Nottingham.

Disinfecting  
stove.

The total cost incurred in the construction of the hospital (including the preparation of the site, the prizes for the designs, &c.) was as follows:—

Cost of  
construction.

	£	s.	d.	£	s.	d.
<i>Cost of site.</i>						
Purchase money of site and interest thereon...	1,808	8	2			
Expenses of conveyance of site... ..	8	17	4			
				1,817	5	6
<i>Cost of preparing site.</i>						
Foundation walls for raising ground, &c. ...	1,467	0	0			
Laying out grounds ... ..	349	4	0			
				1,816	4	0
<i>Cost of construction.</i>						
Preliminary expenses ... ..	110	14	9			
Construction of buildings, &c. ... ..	16,092	15	3			
Clerk of the works ... ..	257	4	11			
Architect's commission ... ..	908	4	11			
				17,368	19	10
Disinfecting apparatus ... ..	...	...	...	100	0	0
				£21,602	9	4

It should, however, be noted that the item 16,092*l.* 15*s.* 3*d.* includes a sum of 2,188*l.* incurred owing to a re-arrangement of the buildings which was deemed necessary after the works had been commenced.

## SOLIHULL RURAL SANITARY DISTRICT.

Population, estimated in 1880, 20,000; rateable value, 150,000*l*.

The Solihull rural sanitary district is coterminous with the Solihull Union; it covers 46,490 acres, and its northern boundary adjoins the borough of Birmingham. The hospital for infectious diseases was erected in 1877, being opened in October of that year. It is situated in the Lyndon quarter of the parish of Bickenhill, now annexed to Solihull, and it is known as the Bickenhill Hospital. Although not placed in a central part of the rural district, the site has been well chosen as regards the population of the district, all the populous localities, with one exception, lying at distances varying from about one to three miles of it. Solihull lies about three miles to the south of it. The soil is clay overlying sand, and the site, which covers some two acres, occupies a completely isolated position, and has hence as yet only been enclosed by hedge-rows.

The hospital buildings are of brick, and they consist of an administrative block communicating by two separate covered passages, which admit of cross ventilation by means of sliding doors, with two-ward pavilions, one to the front the other to the rear. All these buildings are constructed on solid brick foundations, carried some depth below the surface; their floors are well raised above the surface of the soil, and their outer walls vary from 18 inches to 14 inches in thickness. There are also certain outbuildings. The administrative block contains a room for the caretaker and his wife, an extra bedroom, a surgery, a kitchen, a scullery, and a pantry. The pavilion lying to the front consists of two wards, which are separated in the centre of the building by means of an entrance lobby continuous with the covered way, a nurse's room, fitted with fixed windows commanding a view of both wards, and a room in which a movable bath is situated. Both wards are 24 ft. square and 14 ft. in height, and they each contain four beds, each bed thus having 144 ft. of floor space and somewhat over 2,000 cubic feet. The wards are both provided with six double-hung sash windows, three in each opposite side wall, the window area being at the rate of about 1 square foot to every 70 cubic feet. The walls are whitewashed and have a coloured dado. There is in each ward an open fireplace, provided with an air chamber from which warmed air passes into the wards. Four Sherringham ventilators are placed just below the wall plate, two in either side wall, and a ventilating opening is also provided in the ceiling. This opening communicates with a well-ventilated space between the ceiling and the roof. Opening out from the outer end of each ward is a projecting building containing a sink and an earth-closet. These are provided with means of cross ventilation, and between them and the wards are lobbies similarly ventilated. The partition, however, which divides the closets, &c. from the lobbies is not continued to the ceiling, and hence the value of the lobby is materially diminished.

The pavilion at the back of the administrative block is of very similar construction, the only difference being that the wards are smaller, and have one window only in each opposite side wall. They measure 24 ft. by 13 ft. and are 14 feet high. There are two beds in each, thus giving 156 feet of floor space and 2,184 cubic feet per bed.

The hospital is thus adapted to receive 12 patients, and to accommodate persons suffering from two different infectious diseases in both sexes.

The outbuildings are situated near to entrance from the roadway, and they consist of a porter's room, a laundry, an ambulance shed containing a carriage stripped of its linings, a fumigating chamber, coal stores, &c.

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Site and soil.

Hospital  
buildings.



The grounds immediately surrounding the buildings are laid out with grass and shrubs, one portion of the site being reserved as a field.

The water-supply is from a well sunk on the premises. The drainage is into a cess-pool in the field, its contents being dealt with by sub-irrigation. There is no direct communication between the drains and the interior of the buildings.

The admissions to the hospital, together with the deaths registered in the rural district from the diseases specified, during the three years 1878-80, have been as follows:—

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On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.  
Water-supply and drainage.  
Admission of patients.

Date.	Small-pox.		Scarlet Fever.		Diphtheria.		Fever.	
	Deaths in Rural District.	Admissions to Hospital.	Deaths in Rural District.	Admissions to Hospital.	Deaths in Rural District.	Admissions to Hospital.	Deaths in Rural District.	Admissions to Hospital.
1878 ... ..	0	8	9	25	4	0	2	0
1879 .. ...	0	1	11	7	8	4	2	0
1880 ... ..	0	1	1	1	1	1	4	2
1878-80... ..	0	10	21	33	13	5	8	2

The hospital is stated by Dr. George Wilson, Medical Officer of Health for the Warwickshire Combined District, in which Solihull is situated, to have been most useful in holding in check small-pox, diphtheria, and especially scarlet fever, and I was informed by Dr. Page, the medical officer to the hospital, that with the exception of one, or perhaps two, cases in which a second attack of scarlet fever have occurred within two days of the removal of a patient, the disease having obviously been contracted before such removal, no spread of that disease had taken place in any house from which the first patient attacked had been removed.

Value of isolation.

This statement is fully borne out by an analysis of cases drawn up by the Inspector of Nuisances for Dr. Wilson, and from which it appears, 1st, that in 22 of the cases of scarlet fever isolated no further spread took place, two of the patients being removed from one house at the same time; 2nd, that in five cases where a first attack of diphtheria was removed to the hospital, no second attack occurred in the house; 3rd, that in three instances where a first case of small-pox was removed, no further attacks occurred: and 4th, that the same result followed the isolation of the two cases of enteric fever.

The total number of cases removed to hospital has, however, been small when compared with the attacks heard of, this being partly due to the fact that in a large number of houses such isolation could be carried out as to do away with the possibility of any suggestion being made as to compulsory removal, and partly to the circumstance that, though many cases are voluntarily reported to the Sanitary Authority, the notification is, as a rule, not made at an early stage of the disease.

All houses or rooms, as the case may necessitate, from which patients are removed, are at once cleaned and fumigated, the clothing being submitted to the same process, and the bedding at times burned. Similar

Cleansing of infected houses, &c.

APP. NO. 1.

measures are adopted at a later stage, when patients are treated at their own homes.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Public Health Act, 1875, ss. 124 and 132.

General and medical administration.

No proceedings have ever been taken under sections 124 or 132 of the Public Health Act, 1875. In one instance action under the latter section was threatened, a small sum being at once repaid to the Sanitary Authority. In one other case, a part of the cost of maintenance was repaid by a patient; but in all other cases the entire expenses of isolation and treatment have been borne by the Authority.

The general and medical administration of the hospital has been in the hands of Dr. Page, of Solihull, who was in 1877 appointed to act as medical officer to the establishment, a fee of 3*l.* 3*s.* being paid for each patient under his care. In 1879 the payment by fee was abolished, and a salary of 100*l.* a year was paid in its stead, this sum being further reduced to 60*l.* in 1880.

Although patients could at their own cost be attended by medical practitioners of their own choice, none have ever availed themselves of this permission. A care-taker and his wife, who have been respectively styled master and matron, have hitherto been permanently resident on the premises at a salary of 100*l.* a year. Nurses have been engaged from Birmingham and elsewhere as required.

Cost of construction, &c.

The expenses incurred in the purchase of the site and the erection of the hospital buildings were as follows:—

	£	s.	d.
Purchase of land - - -	415	0	0
Erection of hospital buildings -	2,537	12	7
Laying out and planting grounds -	188	7	0
Furniture, fittings, &c. -	153	5	11
Public Works Loan Commissioners charges - - -	13	2	6
	£3,307	8	0

Cost of maintenance, &c.

The current expenses during the three years 1878-80 have been as follows:—For the year 1878 they amounted, as nearly as can now be ascertained, to 300*l.*, this sum including 105*l.* 2*s.* paid to the medical officer, and 70*l.* to the care-taker and his wife. During the year 1879 they amounted to 307*l.* 16*s.* 1*d.*, including 100*l.* to the medical officer, a similar sum to the care-taker and his wife, and a sum of 20*l.* which was paid to the Inspector of Nuisances for the removal of patients. The interest at the rate of 3½ per cent. on capital amounted to 115*l.* 10*s.*, making a total of 423*l.* 6*s.* 1*d.* In 1880 the current expenses were 216*l.* 2*s.* 7½*d.*, including 60*l.* to the medical officer, and 100*l.* to the care-taker and his wife. This, together with interest on capital, makes the total cost of the hospital for the year to 331*l.* 12*s.* 7½*d.*

Closure of the hospital.

Early in 1881 the Sanitary Authority determined to close the hospital, and they made an arrangement with the Corporation of Birmingham for the admission into the borough hospital for infectious diseases of cases of small-pox and scarlet fever arising in this district; the use of that hospital being limited to those two diseases. The arrangement is subject to a payment of 30*s.* per week for each patient, a sum of 1*s.* a mile for the removal of patients, 5*s.* for each use of the disinfecting stove, and such expenses of burial as may be necessary in case of death. The agreement may be determined at any time by a three months' notice from either party, and in case the amount of accommodation for the purposes of the borough should at any time be found insufficient, the Corporation reserve to themselves the right to put an end to it by a 14 days' notice.



When at Solihull I sought information as to the grounds which had led to the closing of the Bickenhill Hospital. Both the Sanitary Authority and their officers admitted that the hospital had been eminently useful in checking the spread of infectious diseases, but the Authority were of opinion that by the removal of patients from their district to the Birmingham Borough Hospital, isolation could be as effectually carried out as it had hitherto been. Some parts of the rural district are from 10 to 12 miles distant from the Birmingham Hospital, and the more populous parts are at a distance of from four to seven miles from it; but it is alleged as regards the inhabitants of the latter localities that owing to the frequent communication which they hold with Birmingham, many of the poorer classes finding employment either in the borough or in the outskirts, the ordinary objection which attaches to removal to a distant hospital is not likely to be raised.

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It is, however, freely admitted that the question of expense has materially influenced the Rural Sanitary Authority in the action they have taken. The cost per patient in the Bickenhill Hospital has varied from about 10*l.* in 1878, when 33 patients were under treatment, to about 41*l.* in the year ending November 30, 1880, when only eight patients were admitted, and although the Authority do not consider the expenditure of the latter sum an excessive one, when, by the isolation of a few patients at such a cost, the spread of infection can be prevented, yet they feel so convinced that this result can equally be obtained by the expenditure of some 6*l.* per patient in the Birmingham Hospital that they do not feel justified in keeping the Bickenhill Hospital open. Indeed, I am informed that had the hospital for infectious diseases in Birmingham been open in 1877, the latter hospital would not have been built until it had been ascertained how far the borough hospital met the requirements of the rural district. But, on the other hand, the Authority state that if no alternative means of isolation were available, they would not hesitate to continue the use of the Bickenhill Hospital.

The experiment remains to be tried. In connexion with its prospect of success or otherwise it is worthy of note that of the total patients admitted into the Bickenhill Hospital in the three years 1878-80 only 11 were removed over 5 miles. Three of these were scarlet-fever patients, two being adults, and the third a child of one of the adult patients; one was an adult suffering from enteric fever; and the remaining seven were small-pox patients, whose removal to hospital is but rarely opposed in any part of the kingdom, whatever the character of the building, or wherever it is situated. I would also refer to the report on the hospital at Birmingham, with special reference to the population which it professes to deal with, and to the undesirability, if not the impossibility, of providing increased accommodation on the existing site.

#### SOUTHPORT URBAN SANITARY DISTRICT.

Population in 1881, 32,191. Rateable value, 204,000*l.*

In January 1876, small-pox was imported into the borough of Southport, and soon became epidemic. In the early stage of the outbreak, the cases were, under an arrangement which then existed between the Urban Authority and the Governors of the Southport Infirmary, removed to certain wards reserved for cases of infectious diseases at that establishment. These wards were, however, in direct communication with the main building, and the disease having extended to some of the nurses, the Governors determined no longer to receive cases of infectious fever. The Sanitary Authority then took temporary possession

Spread of  
small-pox in  
Southport  
Infirmary.

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Provision of  
hospital  
following  
small pox  
epidemic.

Site and soil.

of two, and ultimately of eight, semi-detached cottages, and, as the disease was still on the increase, they later on erected a wooden pavilion on some Corporation property near the gasworks. This pavilion has since been pulled down.

On the termination of this epidemic, which led to some 200 attacks, the Sanitary Authority determined to make permanent provision for the isolation of cases of infectious diseases, and the existing building was erected in 1877.

The hospital occupies a somewhat irregular piece of land, about  $1\frac{1}{2}$  acres in extent, situated in an isolated position about one mile out of Southport. The nearest dwelling is a farmhouse some 300 feet distant. The soil is peat, covered with a thin layer of sand. Below the peat is a bed of clay, and on this the chimney shafts and some of the heavier portions of the buildings rest. The site is enclosed by a dyke constructed for the purposes of soil drainage, and by a belt of trees and shrubs.

The principal hospital buildings consist of an administrative block flanked on either side by a ward pavilion; a covered passage, open at the sides, forming the means of approach from one to the other. There are also three detached buildings. One contains the disinfecting chamber, a room for the temporary reception of articles which have been disinfected, a coal shed, a stable, an ambulance shed, and a shed containing a duplicate iron cart for articles requiring disinfection; the second is a washhouse; and the third a mortuary.

The pavilions are, on account of the nature of the soil, constructed of light corrugated iron. They have brick foundations, and are lined throughout with polished tongued-and-grooved spruce boards; the walls being 4 inches thick. Each pavilion is divided into two wards, which open directly into the outer air; they also communicate with each other through a semi-detached nurses' room. There are thus four wards capable of receiving patients of both sexes suffering from two separate infectious diseases. Each ward contains six beds, and is 32 feet in length and 23 feet in width. The ceiling rises with the roof, the height to the wall plate being 9 feet and to the ridge about 16 feet. Each bed therefore has 106 feet of floor space, and some 1,400 cubic feet. There are in each ward four windows, two being placed in each opposite wall, thus affording means of cross ventilation. The lower part of the windows is fixed, the upper part is pivot hung, and opens towards the roof. Additional means of ventilation are afforded by means of covered openings in the roof fitted with archimedean screws. Each ward has an open fireplace fixed in the dividing wall of the pavilion, and at the other extremity is a bathroom and an earth-closet, both opening directly into the wards. These latter are admittedly faulty as regards ventilation and construction. The wards are neatly furnished; they have a cheerful appearance, and are extremely clean. Ledges capable of retaining dust are conspicuous by their absence.

The administrative block contains a kitchen, a surgery, and a store-room.

Water is laid on to the premises from the Southport Waterworks. The means of drainage is defective. All solid excreta, and as far as possible all infected liquid slops, are buried, but ordinary slop water is allowed to flow into the moat around the site. There are no direct communications between the buildings and the drains.

The disinfecting apparatus is that manufactured by Messrs. G. C. Fraser & Co. The iron cart, in which infected articles are placed, is closed by means of a movable iron door, and is provided with three shelves, the upper one being large enough to hold a double

Water-supply  
and drainage.

Disinfecting  
stove.

Hospital  
buildings.



mattress. The cart is sent for the articles to be disinfected, and it is then wheeled into a chamber, which is constructed of fire-brick, and is connected by means of flues with a furnace. Before closing the chamber some sulphur is placed in it, and the temperature inside the iron cart is then raised to from 220° Fahr. to 250° Fahr. I am informed by the care-taker who manages it, and who was formerly an "engineer," that he can easily control the temperature by means of dampers. He added that he had used it at frequent intervals for over twelve months, and that, with the exception of a blanket which was put in damp, no article has ever been damaged. When articles, such as silk dresses, lace, and seal-skin jackets have been dealt with, the temperature has not exceeded 220° Fahr., but this, I am assured, is the minimum temperature which has been attained. The process of disinfection generally lasts two hours and a quarter.

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No experiments appear to have been made as to the temperature attained inside beds, pillows, &c., but Dr. Vernon, Medical Officer of Health for Southport, informs me that during the small-pox epidemic the clothing, &c. of 130 patients was dealt with in the stove, and in no instance did a second attack occur after the disinfected articles had been returned to the houses of their owners. This result may have been in part due to the fact that the population largely protected themselves by means of vaccination at that date, but during the four years which have succeeded, a similar experience has been observed with regard to other diseases than small-pox. During recent years the stove is stated to have been largely used by the general population, who, if they can afford it, are charged 3s. 6d. for each cartfull of articles dealt with. In this way some 20*l.* a year are paid to the Sanitary Authority by the public.

The number of cases admitted into the hospital, and the total deaths registered in the borough from the diseases specified, during the three years 1877-79 have been as follows:

Admission of  
patients.

Date.	Small-pox.		Scarlet Fever.		Enteric Fever.	
	Deaths in Borough.	Admitted in Hospital.	Deaths in Borough.	Admitted in Hospital.	Deaths in Borough.	Admitted in Hospital.
1877    ...    ...	1	2	2	0	13	5
1878    ...    ...	0	0	14	2	14	5
1879    ...    ...	0	0	5	2	2	2
Three years 1877-79    }	1	2	21	4	29	12

The number of admissions is thus small, but I am assured that it includes all in which isolation was imperatively called for. It is also noteworthy that all the cases admitted have been first attacks, and that in no instance has a second attack of the same disease occurred in the house from which the patients have been removed. The patients have, with one exception, all been derived from the poorer classes and the smaller tradesmen's families, and they include some outdoor paupers from the Urban District, such cases being admitted on payment by the guardians of 3s. 6d. a day, the same sum as is charged to all patients who can afford to pay. When cases of infectious disease occur

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On the Use and  
Influence of  
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Dr. Thorne.

in the numerous lodging-houses in Southport, the family affected is almost invariably required to rent the entire house, and after recovery the premises are "disinfected," either under the supervision of the Medical Officer of Health or by the Inspector of Nuisances acting under the instructions of the medical practitioner who attended the patient and who certifies as to its efficiency. Otherwise steps are taken to prevent the house being re-let. The bedding and other infected articles are also dealt with in the stove at the hospital.

Incidental use  
of hospital.

Apart from the patients who have been under treatment in the hospital, several persons suspected of having some infectious fever have been removed to it and retained there in a separate ward until it has been discovered that the suspicion was unfounded.

Public Health  
Act, 1875, s. 124.

In one instance the Sanitary Authority found it necessary to enforce removal to the hospital under section 124 of the Public Health Act, 1875. The patient, a married woman, was suffering from small-pox during the epidemic of 1876. She had a room to herself, and the inmates of the house were limited to members of her own family. But the neighbourhood in which she lived being a crowded one, it was considered that the spread of infection would almost necessarily be the result of her remaining at home; and it was solely in order to prevent this that the order for removal was asked for. While the removal was being effected a police constable who was present with a view of rendering assistance, was assaulted by the patient's sister. This person was subsequently summoned and fined for a common assault. Since this date no further difficulty has ever been met with.

Public Health  
Act, 1875, s. 132.

It has never been found necessary to take proceedings with a view of recovering the cost of maintaining patients in the hospital. The principal repayments have been made by the guardians, by masters for their domestic servants, and also by the smaller tradespeople who under some circumstances pay by instalments. If any difficulty arises at the time of the removal of a patient owing to an alleged inability to pay the necessary expenses of maintenance, Dr. Vernon informs the persons making objection, that they will not be unduly pressed by the Sanitary Authority, and he informs me that this assurance has always sufficed to remove any objection of this sort. The fact of paupers being admitted has occasionally led to questions being asked as to whether the hospital was a pauper establishment or not, but an explanation to the effect that it was the property of the Urban Authority has always satisfied the inquirers.

Admission of  
paupers.

Adminis-  
tration.

The general administrative control of the hospital is in the hands of Dr. Vernon, who also has sole medical charge of the patients. The remuneration assigned to these duties is included in that attaching to the post of Medical Officer of Health. Medical practitioners can visit their patients whilst in the hospital, but they take no part in their treatment. A care-taker and his wife, who was formerly a hospital nurse, reside at the hospital. The former has general charge of the buildings, attends to the grounds, and manages the disinfecting stove; the latter acts as nurse. They receive an annual salary of 100*l.* a year, together with fire and lights, but they provide their own board at all times.

Cost of con-  
struction.

The original cost of the hospital was 1,868*l.* This sum includes 1,206*l.* 10*s.* expended in the erection of the buildings, and 559*l.* on furniture and fittings. The site is held on a 99 years' lease at a rental of 27*l.* 4*s.* a year. The total cost of maintaining the hospital and patients was 245*l.* in 1877 and 198*l.* in 1878. These amounts were, however, reduced by 44*l.* 2*s.* in 1877 and 65*l.* 10*s.* in 1878; sums which were paid to the Sanitary Authority by the guardians and friends of patients.

Cost of main-  
tenance.



STOCKTON URBAN SANITARY DISTRICT.

APP. NO. 1.

Population in 1881, 41,040. Rateable value (1879), 138,000*l*.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.  
Site of hospital.

A hospital for infectious diseases was provided for the Urban Sanitary District of Stockton in 1869, and has been available for the reception of patients since January 1870. It is situated in the borough, and is one of a row of dwelling-houses known as Cleveland Row, fronting towards the River Tees, from which it is separated by an open space somewhat over 100 feet in width.

The hospital is an old three-storied house. On the ground floor are the resident nurse's sitting and bed room, the kitchen, and other administrative offices. On the first floor are three rooms used as wards. One with a cubic capacity of 2,430 feet holds two beds, and two others having respectively a cubic capacity of 1,890 feet and 1,306 feet contain one bed each. They have ordinary sash windows in one wall only, and they open into a common lobby. On the second floor are two more rooms, which are somewhat dilapidated, and admit the rain. These were not furnished at the date of my visit. Earth-closets are used in the wards. Behind the house is a small yard about 24 feet by 12 feet, enclosed on three sides by houses. In this yard is a watercloset, and in a passage tunnelled beneath a warehouse, and leading from the yard into Hunter's Lane behind, is a "Nelson's disinfecting stove," for the purposes of the hospital. The stove is heated by gas, and the nurse who has the charge of it informs me that she always heats it until the thermometer indicates a temperature of 140° Fahr., and that she has never scorched any article dealt within it. I found, however, that the lid did not completely close when the stove was fixed and ready for use. The water-supply to the hospital is from the Corporation Waterworks, and the drainage is, by means of a separate sewer, into the Tees, there being one direct communication between it and the interior of the building. An ambulance, consisting of an ordinary carriage stripped of its linings, is kept in a separate building in the "Corporation Yard." After being used it is subjected to the fumes of burning sulphur.

Hospital buildings.

Disinfecting stove.

Water-supply and drainage.

The use of the hospital is confined to non-pauper residents within the borough, and the number of cases admitted during the four years 1876-79 has been as follows:—

Admission of patients.

Date.	Small-pox.	Enteric Fever.	Scarlet Fever.	Other Diseases.	Total.
1876 ... ..	—	6	1	—	7
1877 ... ..	—	4	2	—	6
1878 ... ..	13	2	2	1	18
1879 ... ..	—	2	4	2	8
1876-79 ... ..	13	14	9	3	39

The records of this hospital, so far as the patients are concerned, are very imperfect, and I was unable to procure detailed information as to the classes by whom it had been used. The patients were, however, mainly derived from amongst the very poor, some being paupers sent in by the guardians, and from domestic servants; there being occasional admissions from a somewhat better class, such as clerks, policemen, &c. The hospital has been but little used for the isolation of cases of infectious disease occurring amongst children, its want of attractiveness being assumed to have in part influenced parents in objecting to the removal of their children to it. During 1879 as many as 84 deaths,

Status of patients.

## APP. NO. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Payments by  
patients.

Grounds for  
restricted use  
of hospital.

Influence of  
hospital on  
surrounding  
neighbour-  
hood.

admittedly representing some 800 cases, took place in the borough from scarlet fever alone, whereas only four patients were admitted from that disease, one being an articled pupil, two the children of a ware-houseman, and one the child of the resident nurse, he having come here on a visit to his mother. How far the question of payment for board and medical treatment in the hospital has deterred the inhabitants from making use of the hospital, I could not ascertain. A charge, however, of 1*l.* per week is made by the Sanitary Authority to nearly all patients for whom the guardians do not pay, although payment has never been enforced when it has been ascertained that the patients or their relatives were not in a position to afford the amount. The patients, too, are obliged themselves to provide for medical attendance, except in the case of the very poor sent in by Mr. A. E. H. Trotter, the Medical Officer of Health. In these latter cases Mr. Trotter has himself attended the patients, and he has considered that his salary as Medical Officer of Health covered such services. Two causes have clearly hindered its use. The first is that the Medical Officer of Health, who hitherto has only received a monthly return of all deaths, has rarely been able to hear of first cases of scarlet fever in time to stay its spread by means of isolation; and the second is one into which it will be necessary to enter in some detail, relating as it does to some public discontent as to the use of the building for the purposes of a hospital, on the ground that it has led to the dissemination of disease in its vicinity. Indeed the Sanitary Authority, out of deference to the wishes of the inhabitants, have already determined to relinquish the building in November 1880, and pending future arrangements, they have agreed with the Corporation of Middlesborough to pay 2*l.* per week for any patients they may send to the Middlesborough Hospital for Infectious Diseases, some three or four miles away.

In April 1878 small-pox became epidemic in the borough, and many of the cases being reported to the Medical Officer of Health, 13 persons suffering from this disease were, during the next few months, admitted into the hospital. In the month of June a young woman residing in one of the houses immediately adjoining the hospital had a slight attack of small-pox. Following on this a resident drew up a memorial to the Local Government Board, on behalf of some of his fellow townsmen, in which he pointed out that the hospital was situated in a street with houses on either side and at the rear of it, in one of the most densely populated parts of the town, in close proximity to an open space where "crowds of small children" were in the habit of playing, and in the immediate vicinity of ship yards, to and from which large numbers (admittedly some thousands) of workpeople were daily crossing the river. He further alleged that as a result of these conditions small-pox was spreading in the borough.

When in Stockton I had an interview with the memorialist, and with his brother, the head of the family in whose house the above-named young woman resided. From both I received a general statement that small-pox had prevailed in the neighbourhood of the hospital, but with the exception of three instances, which were specified, nothing in support of this view could be elicited. The first of these three cases is the one already referred to in a house adjoining the hospital. With regard to this attack it was alleged that whilst cases of small-pox were under treatment in the building, blankets and bed linen, if not bedding, were hung out of the hospital windows, within five feet of the open windows of the house adjoining. Whether these articles had first been "stoved" or not, I could not ascertain, owing to a change in the office of nurse since the date in question. I was also informed that during the process



of "disinfection" a disagreeable odour had been noticed. With regard to the real cause of this attack of small-pox I could, owing doubtless in part to lapse of time, procure no information. The following points, however, must be noted:—1<sup>o</sup>, that when the attack occurred the disease was already extensively prevalent in all parts of the town; 2<sup>o</sup>, that up to the date of the attack no other case could be heard of within a quarter of a mile of the hospital; 3<sup>o</sup>, that in any hospital properly situated and well administered no such occurrence as the exposure of bedding, &c. from the windows of wards in close proximity to residences could have been possible. And this leads me further to point out that the hospital has never been subject to proper medical supervision, its entire administration being left to the resident nurse.

The second of the three attacks occurred in the same row in a house situated about 80 feet to the east of the hospital; the patient being a servant girl who a week after being discharged from the house in question is stated to have died of small-pox. Accurate details as to her previous movements cannot be procured, but it is admitted that she had been in the habit of running to the ambulance whenever it arrived at the hospital, in order to watch the removal of the patients, and that she had in this way brought herself into close communication both with the patients and the infected carriage. Unfortunately the removal of patients from the ambulance was, owing to the arrangement of the premises, necessarily effected in the public street.

The third attack occurred at the back of another street situated about 160 feet from the hospital, and, so far as cause is concerned, no information as to this case was forthcoming.

I next made inquiry with a view of ascertaining whether any other cases, unknown to the memorialists, had occurred near the hospital, and I had interviews with some of the persons residing in immediate proximity to the building. Some families had lived close to the premises for some years, but in no instance could I learn that small-pox or any other infectious disease had prevailed amongst them.

But during the prevalence of small-pox the Medical Officer of Health received information as to the whereabouts of between 40 and 50 patients, residing in 25 houses: and with his help I was, as regards these cases, able to ascertain the distance between the houses attacked and the hospital. Excluding the three cases already referred to in detail, the result was as follows:—

Number of Houses attacked.				Number of Patients attacked.				Distance of Houses from the Hospital.
1	...	...	...	?	...	...	...	More than $\frac{3}{4}$ of a mile.
6	...	...	...	16	(at least)	...	...	More than $\frac{1}{2}$ a mile.
3	...	...	...	?	...	...	...	More than $\frac{1}{3}$ of a mile.
10	...	...	...	18	(at least)	...	...	More than $\frac{1}{4}$ a mile.
2	...	...	...	?	..	...	...	Between 200 yards and 300 yards.

In short, out of a total of attacks known to have been about 50 in number, only the three specially referred to occurred within 200 yards of the hospital, nearly all the remaining patients residing at distances varying from a quarter to three-quarters of a mile away. And of the three exceptional attacks, one occurred about 160 feet away, with a poor, and as a memorialist properly describes it, a "densely peopled" district intervening; a second, if really brought about by infection from the hospital building or ambulance, was due to the patient purposely throwing herself into contact with the disease, a course of procedure

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which, though it would not necessarily have been obviated by the existence of a much greater distance between the hospital and her home, should not have been possible; and the remaining one, unless indeed the disease was in this case contracted elsewhere in the town then the seat of an epidemic, was brought about by conditions, both of proximity to other dwellings, and of administration which no one would attempt to justify, and which could not have occurred in a properly regulated hospital. And this being the total of harm which can be suggested as having been brought about by this hospital, it should on the other hand be stated, on the authority of a report written by the Medical Officer of Health during the year following the epidemic, that the means of isolation which the building afforded materially aided in staying the spread of the disease. Although only some 50 attacks were heard of by the Medical Officer of Health in the town generally, this does not profess to be the total number of attacks. It may, however, be deemed quite certain that, in view of the agitation then made as to the hospital, all the attacks near that building were brought under the notice of the Authority. In short, the information as to the amount of disease near the hospital is doubtless correct, whereas the extent of its prevalence in other parts of the town, if judged of by the returns supplied by the Medical Officer of Health, is probably much underestimated.

Cost of  
hospital.

The hospital is held on a lease of seven years terminating in November 1880; the rent being 35*l.* a year. The cost of furnishing cannot now be ascertained. The average annual cost of the hospital to the Authority during the four years ending August 31st, 1879, exclusive of rent, but including the nurse's wages, which amount to 52*l.*, has been about 131*l.*; the largest annual sum being 151*l.* 6*s.* 3*d.* in 1878, when small-pox was prevalent. A sum varying year by year from 10*l.* 9*s.* 11*d.* to 11*l.* 15*s.* 9*d.* has been received on behalf of patients, thus reducing the cost to the Authority to about 120*l.* a year.

## SUNDERLAND URBAN SANITARY DISTRICT.

Population, 1881, 116,262. Rateable value, 365,000*l.*

Origin of  
hospital.

The hospital for infectious diseases in the borough of Sunderland was provided in 1871, owing to the existence at that date of an epidemic of small-pox. It consists of an old mansion occupying a fairly central position in the borough, and it stands on an area of about 2,400 yards. On the north side it is only separated from the steep bank bounding the river Wear by a roadway. On the south is a narrow street separating the premises from a locality which is thickly populated by the labouring classes. Immediately to the east is a row of dwellings, and on the west is a large open stoneyard.

Hospital  
buildings.

The house itself, now used as a hospital, comprises six rooms on the ground floor and six on an upper floor. On each floor three rooms are used as wards; four of the wards contain four beds each, and the remaining two, three beds each; the cubic space per bed being in each ward somewhat under 1,000 feet. The remaining rooms are set apart for administrative purposes. The rooms are throughout provided with sash windows, opening top and bottom. The waterclosets open directly into the body of the house. The soil pipes, as also all waste-pipes, have been disconnected from the drains. There is a bathroom fitted with a fixed bath, but it is not in an easily accessible position for the patients. The premises have an outfall sewer, separate from any belonging to the town, direct into the tidal river Wear. The water-supply is from the

Drainage,  
water-supply,  
&c.



town public service. Detached from the main building is a wash-house, a mortuary, an ambulance shed, and a disinfecting oven. The ambulance is in the shape of a closed landau, the seats being fitted with flaps, which can be raised so as to receive a patient in the recumbent posture. The interior of the ambulance is painted, and every time it is used it is disinfected by means of sulphur fumes. The disinfecting stove consists of a brick chamber fitted with iron doors, and it is heated by means of flues from a furnace, which also heats the wash-house boiler. The stove is by no means perfect, it is not quite air-tight, and it is doubtful whether a temperature beyond 220° Fahr. can be obtained in it. Sulphur is burnt in it whenever it is used. Some of the articles which have been dealt with in it have occasionally been scorched, and once some clothing was badly burned.

In addition to these various out-buildings, a cottage and a lodge stand on the hospital grounds. To both of these further reference will be made.

With regard to this hospital, it must be admitted to have many drawbacks. Having been procured on a sudden emergency, the Sanitary Authority had but little if any choice as to the building or the site. The former is ill-adapted to the safe reception of more than one infectious disease at the same time; so much also of the furniture as was originally provided is of a somewhat mean appearance, a drawback which is now, however, being gradually remedied. The site has the disadvantage of a bad approach through Dunning Street, a narrow thoroughfare, lined on either side by poor dwellings.

Notwithstanding these disadvantages, however, the hospital has done good service. During the course of the epidemic of small-pox in 1871-72, as many as 142 patients suffering from that disease were admitted, other rooms being used for their reception besides the existing six wards, and the lodge being occupied for convalescents. When Dr. Yeld, the present Medical Officer of Health to the borough, was appointed in 1873, he found that since the cessation of the small-pox epidemic the hospital had been disused, and that the building had become somewhat seriously dilapidated; but during the following year these defects were made good, and some new furniture was procured. In the meantime, however, the Town Council had, with the sanction of the Guardians of the Sunderland Union, sent certain cases of infectious disease occurring amongst the non-pauper population to the workhouse, where there are two buildings well suited for the reception of such cases, one a substantial brick and stone structure, capable of receiving cases of two different infectious fevers in both sexes; the other, a two-storied wooden building, for the reception of small-pox cases only. This arrangement continued in force until March 1877, when the two Authorities were informed that the reception of non-pauper cases by the guardians ought not to continue.

The Urban Sanitary Authority of Sunderland then appointed Dr. Yeld as physician to their "Fever Hospital" at a remuneration of 10s. for each case attended by him, an arrangement which was discontinued in July 1879, since which date no special agreement has been entered into between the Authority and Dr. Yeld, who still attends the hospital professionally. A nurse was also permanently installed at the hospital, and as occasion arose the permanent staff was increased. At the date of my visit it consisted of Dr. Yeld, a matron, a nurse, and one male attendant. One patient only was at the time under treatment, namely, a pupil from a ladies' school in the borough, who was suffering from measles.

APP. NO. 1.

On the Use  
and Influence  
of Hospitals  
for Infectious  
diseases, by  
Dr. Thorne.

Ambulance.

Disinfecting  
stove.

Defects attach-  
ing to hospital.

Use of hospital  
during small-  
pox epidemic.



APP. NO. 1.

On the Use  
and Influence  
of Hospitals  
for Infectious  
Diseases, by  
Dr. Thorne.

Use of hospital  
since 1877.  
(a.) By Sunder-  
land Urban  
Authority.

Since the hospital was re-opened in March 1877, the admissions have been as in the subjoined Table, which also gives the number of deaths in the borough from the causes specified in the years referred to.

Date.	Small-pox.		Scarlet Fever.		"Fever."		Measles.		Other Diseases.	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospital.
1877 (part of) ...	—	1	138	1	66	11	1	—	?	1
1878 ...	—	—	186	31	59	15*	93	3	?	—
1879 ...	—	—	243	11	33	6	1	—	?	2
1877-79 ...	—	1	567	43	158	32	95	3	?	3

\* Including 5 typhus.

(b.) By Sunder-  
land Rural  
Authority.

(c.) By Sunder-  
land Port  
Authority.

An arrangement has been entered into by the Rural Sanitary Authority of Sunderland for the isolation of cases of dangerous infectious diseases occurring within their district in the borough hospital, but they have as yet not availed themselves of it. A few cases have also been sent in by the Port Sanitary Authority of Sunderland, viz., two in 1877, four in 1878, and two in 1879. And since July 1879 the authorities of the Sunderland General Infirmary have refused to admit into their wards any cases of infectious fever, all such cases being sent by them to the Borough Fever Hospital. Both the Sanitary Authorities named and the Infirmary Authorities pay 1*l.* 1*s.* per week per patient.

Payments by  
patients.

With regard to the question of payment by the patients or their friends, the experience obtained at Sunderland is instructive. Up to September 1877, a fee of 1*l.* 1*s.* per week per patient was in all cases required. It was, however, found by Dr. Yeld that in a large number of instances in which removal to the Fever Hospital was of the first importance, not only for the sake of the patients, but with a view of preventing the spread of the infection, the fee required by the Authority deterred people from allowing the removal of their friends to the hospital. This occurred so frequently in small and somewhat overcrowded houses and in the families of the poorer tradespeople through whose wares infection was expected to be spread, that Dr. Yeld brought the subject under the consideration of the "Health Committee" of the Town Council, and the result was that he was authorised to admit non-pauper cases either free of cost or at any sum which he considered the friends of the patients were capable of paying. The result of this arrangement is believed to have been very beneficial in staying the spread of infection, and during the two years 1878-79 23 patients were admitted free of charge, and 45 on payment, the fee in several cases being as low as 2*s.* 6*d.* per week. Indeed the question of payment is now deemed to be of secondary importance, the main object of the Authority being to procure isolation in all cases where there is a prospect of danger to public health.

Failure to  
secure early  
information as  
to infectious  
diseases,  
hindering  
isolation.

It is true that the admissions to the fever hospital bear but a small proportion to the total number of cases of infectious diseases which are voluntarily reported to Dr. Yeld in his capacity as Medical Officer of Health. In a vast majority of instances, however, this report comes



too late, the patients being often either dead, or too ill for removal, or convalescent, or else the disease has already spread to other members of the families affected. In the Annual Report for 1878 Dr. Yeld refers to the fact that as the result of a notice which was issued during a prevalence of scarlet fever "no less than 136 cases" were reported to him in two weeks, most of them being already "convalescent." Difficulties have also doubtless arisen in the case of club-patients and their families who, having medical attendance of their own choice free of cost, think this a reason for refusing to be removed to a hospital. With a view of obviating these and allied difficulties, it has been made known to the various medical practitioners in the borough that they can themselves attend any patients they send to the hospital, the fees for medical attendance being in such cases paid by the patients; and Dr. Yeld informs me that this arrangement has hitherto led to no inconvenience, the medicines prescribed being, as indeed for all the patients, dispensed by a chemist near at hand, and Dr. Yeld limiting his attendance on such cases merely to the duties devolving upon him as general medical superintendent of the establishment. A similar arrangement is in force with regard to cases sent in from the Sunderland Infirmary, the physicians to the Infirmary regularly visiting the "Fever Hospital." A very firm conviction is, however, entertained that notwithstanding all the difficulties named, the hospital has been of material use in staying the spread of infection in the borough. With regard to typhus and enteric fever not much difficulty has been experienced in getting first cases in, and so preventing further spread. The same result has also at times been attained as to scarlet-fever, but such cases are not so readily heard of, and the patients, being children, their mothers often refuse to part with them. Indeed so much does this latter circumstance prevent a proper use of the hospital that an attempt has recently been made to meet the objection raised by admitting the mother together with the sick, especially where the occupation of the parents has been of such a nature as to facilitate the spread of infection from their homes or shops. Thus, in one instance, four children suffering from scarlet-fever were admitted together with their mother and nurse from a pawnbroker's shop. The mother in this case paid for herself at the same rate as an ordinary patient, the nurse's services being accepted in lieu of payment. And it is Dr. Yeld's firm conviction that the objections to removal to the hospital are far less than they formerly were, and that the amount of persuasion necessary to affect the removal is steadily diminishing. To some extent it is believed that a change in the name of the establishment has conduced to this result, the hospital being now invariably styled the Corporation House of Recovery. In no case has any attempt been made to secure the removal to hospital under sec. 124 of the Public Health Act, 1875. In a few instances the repayment guaranteed by patients has not been made; the amounts, however, in these cases were but small, and it was not considered desirable to take any proceedings with a view of procuring them.

As an indication of the classes from which the cases are now principally admitted, I append the following list giving details as to the last 79 cases admitted, the occupation named being that of the head of the family where children, as was often the case, were the patients:—

Sailor	-	-	-	14	Shopkeeper	-	-	-	4
Miner	-	-	-	11	Actor or actress	-	-	-	3
Pawnbroker	-	-	-	10	Police constable	-	-	-	2
Labourer	-	-	-	8	Soldier	-	-	-	2
Domestic servant	-	-	-	7	Paperhanger	-	-	-	2

APP. NO. 1.

On the Use  
and Influence  
of Hospitals  
for Infectious  
Diseases, by  
Dr. Thorne.

Advantages  
attaching to  
the isolation  
carried out.

Admission of  
young  
children.

Sections 124  
and 132, Public  
Health Act,  
1875.

Social status  
of patients.

APP. NO. 1. On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.	Carmen	-	-	-	1	Draper's assistant	-	-	1
	Civil engineer	-	-	-	1	Housekeeper	-	-	1
	Lady-pupil	-	-	-	1	Shipwright	-	-	1
	Joiner	-	-	-	2	Farm servant	-	-	1
	Barmaid	-	-	-	1	Porter	-	-	1
	Dressmaker	-	-	-	1	Modeller	-	-	1
	Ship's captain	-	-	-	1	Ship-plater	-	-	1
	Apprentice	-	-	-	1				

Influence of  
hospital on  
surround-  
ing neigh-  
bourhood.

It has already been shown that the hospital stands in a thickly populated neighbourhood, and that houses closely adjoin it. Under these circumstances I endeavoured to obtain information as to any spread of infection from the establishment. No complaint of any such spread was ever known to have been made, and none could be heard of as the result of my own inquiries. There is, however, a fairly complete record of cases of infectious disease, and since, excluding 207 cases of diarrhœa, as many as 1,450 such cases came under the notice of the Medical Officer of Health in 1878, I ascertained the exact number which had occurred within certain specified distances of the hospital during that year. Taking the hospital as a centre, I found that within a radius of 200 yards of it there was a population of 1,215 persons, all living, owing to the position of the hospital, on the river side to the south of the hospital buildings. Amongst this population 4 cases of scarlatina, 1 of typhus, and 1 of enteric fever had been reported. Two other centres were then taken in localities having a class of population very similar to that in the first one. One of these was 1,000 yards, and the other 1,500 yards distant from the hospital; and the number of cases of infectious disease known to have occurred within a radius of 200 yards of each was ascertained. In the former of the two there had been out of a population of 3,681, 67 such cases, namely, 50 of scarlet fever, 10 of typhus, and 7 of enteric fever; in the latter, with a population of 4,491, the total number was 88, namely, 73 cases of scarlet fever, 9 of typhus, and 6 of enteric fever. But of the six cases reported as having occurred within a circumference of 200 yards round the hospital, not one had taken place in the street immediately adjoining the hospital premises. So also, in Dunning Street, a street containing 23 houses, tenanted by 72 families consisting of 309 persons, in addition to a mission house, a public-house, and a manufactory, and through which the ambulance has almost invariably to pass, there had only been two cases of scarlet fever, one in June and one in December, out of a total of 591 reported in the borough, and one case of enteric fever. The total number of cases of scarlet fever under treatment in the hospital in 1878 was 31, and the largest number under treatment at any one time was 11 during the month of December. (See Plate, No. XXXVII.)

The character of the three areas referred to being much alike, it is doubtless a matter of accident that the proportion of attacks from infectious disease to population in the area immediately around the hospital was only about one-half of that upon the two more distant areas, but had the conditions accidentally been reversed, to the hospital would almost certainly have attached the discredit of having produced them.

The existence of a cottage and a lodge in the hospital grounds has been referred to. The former originally formed a part of the converted mansion; it is still in actual contact with it, but is provided with a separate entrance. Until a few years ago a family of 10 lived in it, but the number has since been reduced to eight by the removal of two of the elder children. This family occupied the cottage during the small-





PLATE N°XXXVII.



Scale;  $\frac{1}{2500}$  25.344 Ins to a Mile.

*Levels above ordnance datum.*

*To face page 258.*

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pox epidemic in 1871-72, and has remained there ever since. It now consists of the parents and six children, the latter varying from 16 years to one year in age. On no occasion has any infectious disease prevailed in the family since they have resided in the cottage, and so far as immunity from previous attacks is concerned only two attacks from scarlet-fever are remembered to have occurred prior to the removal to the cottage. For some time the lodge was occupied by the Inspector of Nuisances and his family, and they were attacked by scarlet-fever. But as the inspector was frequently in the hospital and assisted in the removal of the patients this is what only might have been anticipated.

APP. No. 1.  
On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Apart from the use of the hospital as a means of isolation a large amount of bedding, clothing, and other articles have been brought there for disinfection, this being as a rule done by the Sanitary Authority free of cost. In 1878 the number of articles so dealt with was 233, and in 1879 it was 257; beds, mattresses, pillows, sheets, blankets, and wearing apparel forming the greater part of the articles forwarded.

Disinfection of infected articles.

The original cost of the hospital was 2,250*l.*, the furniture and fittings amounted to 300*l.* more. There is a ground rent of 25*s.* per annum. The total cost to the Sanitary Authority, exclusive of ground rent and interest on the original outlay, since the hospital was re-opened in March 1877 has been 59*l.* 7*s.* 8*d.* in 1877, 178*l.* 0*s.* 2*d.* in 1878, and 117*l.* 16*s.* 11*d.* in 1879. In 1878, 44*l.* 13*s.* 6*d.*, and in 1879, 26*l.* 16*s.* were received from patients.

Cost of hospital.

#### SWANSEA URBAN SANITARY DISTRICT.

Population in 1881, 65,600 (?). Rateable value, 218,078*l.*

A new general infirmary having been erected in Swansea, the Corporation in 1871 acquired the old infirmary buildings for the purposes of a hospital for infectious diseases for the urban and the port districts.

The site on which the hospital stands is about one and a half acres in extent, and it lies within the borough and immediately to the south-west of its more central portions, but about 3½ miles from one of the more thickly inhabited parts of the district.

Hospital site.

The hospital buildings call for but little description. They consist in the main of two wings meeting at right angles; they each contain two floors, and the whole has, both externally and internally, a dilapidated and deterrent appearance. Indeed it has been determined, as soon as a new site can be obtained, to erect an entirely new hospital. One wing is reserved for the patients and the other for administrative purposes. The former contains eight small wards; four in each floor opening into a common corridor.

Hospital buildings.

The accommodation suffices for some 16 patients. Not more than one disease could, however, be treated in the wing at the same time without risk of the spread of infection.

A cab and a hand ambulance are used for the removal of patients to the hospital; and a disinfecting apparatus heated by steam which is passed into a "double-jacket" of iron, is also kept on the premises.

Ambulance disinfection.

A charge of 18*s.* a week is made in the case of ordinary patients, who are expected themselves to arrange for medical attendance; Mr. Ebenezer Davies, the borough medical officer of health, has, however, discretion in certain cases to promise some remission of the fees. Paupers from the borough are admitted at a rate of 12*s.* a week, and they are attended by the medical officer to the workhouse.

APP. NO. 1.

The number of cases admitted from, and the deaths registered in, the urban district from the causes specified, for the six years 1875-80, are shown in the following Table:—

Date.	Small-pox.		Scarlet Fever.		"Fever."		Other Diseases.	
	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Ho pital.	Deaths registered.	Admissions to Hospital.	Deaths registered.	Admissions to Hospt. I.
1875 ... ..	1	2	43	4	28	25	?	—
1876 ... ..	4	7	33	2	19	20	?	1
1877 ... ..	5	18	16	—	17	18	?	3
1878 ... ..	5	14	9	—	24	18	?	—
1879 ... ..	—	1	118	7	100	51	?	1
1880 ... ..	—	—	184	8	26	13	?	2
1875-80 ...	15	42	403	21	214	145	?	7

So far as cases of small-pox are concerned the means of isolation have sufficed; a considerable number of cases of enteric fever have also been admitted. Of the latter, however, a very large proportion have been paupers; indeed, out of a total of 215 admissions from all causes in the five years, as many as 118 have been paupers, and the remainder have, as a rule, consisted of the poorest classes, sailors, &c. The admission of paupers has, especially as regards the artizan class, deterred others from using the hospital. The character of the buildings themselves has had a similar effect. And further, although the arrangement by which patients can choose their own medical attendant whilst in hospital, has secured the isolation of some who would not otherwise have entered the building, yet the absence of any proper arrangement for medical attendance on the poor who are not paupers, and who in their own homes can be attended by medical men attached to the various works or clubs without any increase of the ordinary club or other fees, has also hindered the use of the hospital. Two cases of small-pox were in 1874 removed to the hospital under a magistrate's order. No proceedings have in any case been taken to recover the costs of maintenance, but every effort short of compulsion is made to secure repayment, and this again is known to act as a serious hindrance to isolation amongst the labouring classes.

Inquiry being made as to any spread of infection from the hospital to the surrounding neighbourhood, a case was reported to me in which an attack of small-pox arose in a house 238 feet from the hospital windows after the admission of a seaman who was suffering from that disease. No other source of infection could be ascertained; the interval between the seaman's admission and the attack corresponded with the required period of incubation; and it is known that the direction of the wind was favourable to the spread of the poison if it could have been conveyed by means of the air. But there was also a possibility of personal communication between the hospital and the premises affected which could not be disproved.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Admission of patients.

Admission of paupers.

Hindrances to isolation.

Public Health Act, 1875, sections 124 and 132.

Influence of hospital on surrounding neighbourhood.



The cost of maintaining the hospitals and the sums received on behalf of patients during the past five years, have been as follows:—

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Cost of maintenance, &c.

						Cost of Maintenance.			Received on behalf of Patients.		
						£	s.	d.	£	s.	d.
1876	...	...	...	...	...	273	1	10	41	2	9
1877	...	...	...	...	...	251	2	0	80	6	9
1878	...	...	...	...	...	242	11	4	76	3	9
1879	...	...	...	...	...	141	14	11	41	16	10
1880	...	...	...	...	...	471	0	9*	109	13	10*

\* Some of the items included in these two amounts belong properly to 1879.

### TODMORDEN URBAN SANITARY DISTRICT.

Population in 1881, 23,861. Rateable value, about 72,000*l*.

In 1874 small-pox became epidemic in Todmorden, and the existing hospital was provided by the Urban Sanitary Authority with a view of staying its spread.

Small-pox epidemic leading to hospital provision.

The hospital premises comprise an old cotton-mill and two cottages which, together with a third cottage not belonging to the hospital, form one block of two-storied buildings. The mill and one cottage were originally purchased by the Authority; the second cottage has been taken on lease at a yearly rental of 4*l*., and added to the hospital; and the third cottage referred to, though adjoining the hospital premises, is not the property of the Sanitary Authority, and is tenanted by an elderly widow.

Hospital buildings.

One of the hospital cottages is set apart for the nurse and her husband, both of whom have resided there since 1874, before which date they had been in service as female and male nurse respectively in the Royal Infirmary at Manchester. The second cottage constitutes the hospital kitchen, and has two bed-rooms which can be used for nurses when the hospital is full, or, as at the date of my visit, for an occasional single patient. As yet the upper story only of the mill has been fitted for the reception of patients. It has been divided longitudinally by a wooden partition into two wards, opening into a common lobby which is fitted with cupboards for drugs, a lavatory for medical men in attendance on cases, &c. The nurses' bed-rooms in the second cottage referred to also opens on to this lobby. Each ward is 49 feet in length, 14 feet in breadth, and about 13 feet in height, the roof not being ceiled. There are 12 beds in the two wards, each bed having 114 feet of floor space, and about 1,490 cubic feet. Each ward is well lighted by eight windows, six on the wall facing the beds which stand with their heads to the wooden partition, and two in the wall at the end of the building. The windows open in the upper half only. In the ceiling of each ward there are six ventilators communicating with a space beneath the roof which is open to the air. The wards, which are very clean, cheerful, and comfortably furnished, are fitted with lavatories supplied with hot and cold water, earth-closets, and a movable bath, and they are heated by means of hot-water pipes.

In addition to the main building there are, 1<sup>o</sup>, a washhouse and laundry; 2<sup>o</sup>, a dead house; 3<sup>o</sup>, an iron disinfecting apparatus originally intended to be heated, but now only used as a fumigating chamber; 4<sup>o</sup>, a pail closet; and 5<sup>o</sup>, an ambulance shed.

Ambulance

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Water-supply  
and drainage.

Situation of  
hospital.

Arrangement  
with—  
(a.) Bacup  
Urban Autho-  
rity.

(b.) Guardians  
of Todmorden  
Union.

Admission of  
patients.

The latter contains a well-built light ambulance having much the appearance of a neat private omnibus. It was manufactured by Messrs. Sherratt and Ream, of Chorlton-on-Medlock, and it is fitted with a movable stretcher, which can be carried to and from the patient's bedside. The cost was 64*l*.

The water-supply is from a spring on the neighbouring moorland; the drainage, which is defective, is into a channel in a field leading to a watercourse which joins the River Calder.

The hospital is situated at Sour Hall, an isolated hamlet nearly on the summit of a range of hilly moorland to the west of Todmorden, about 2½ miles from Todmorden town, but as much as 5 miles from some of the populated parts of the urban district which covers about 16,000 acres. The road leading to it is in part rough, steep, and stony.

In 1877 the Urban Sanitary Authority of Bacup made an arrangement for the admission of cases of infectious diseases from their district into the hospital, the terms of the arrangement being that they should pay to the Todmorden Local Board of Health an annual rental of 40*l*., half the permanent expenses incurred in the maintenance and administration of the hospital, and the actual costs of any patients sent in by them.

The guardians of the Todmorden Union have also on several occasions used the hospital for the isolation of paupers suffering from infectious diseases, the scale of payment being at the rate of 25*s*. a week per patient, in addition to the cost of any alcoholic stimulants prescribed, and a fee of 5*s*. for the use of the ambulance.

The total cases admitted into the hospital from November 21, 1874, when it was opened, have been as follows:—

—	Small-pox.	"Fever."	Measles.	Total.
21st November to end of December 1874 ... ..	29	—	—	29
1875 ... ..	15	—	—	15
1876 ... ..	3	2	—	5
1877 ... ..	1	—	—	1
1878 ... ..	1	—	—	1
1879 ... ..	1	—	2	3
Total ... ..	50	2	2	54

Failure on the  
part of Tod-  
morden  
Sanitary  
Authority to  
secure  
isolation.

It will thus be seen that since the termination of the small-pox epidemic the hospital has hardly been used at all. Indeed, so far as Todmorden is concerned, it should be noted that with the exception of a single case of small-pox, and of two cases of measles occurring in domestic servants in 1879, the hospital has not been used since 1876, for the two cases sent in in 1877 and 1878 were from Bacup. This circumstance is the more remarkable in view of the mortality statistics of the Todmorden Urban District for the three years 1877-79, from which the following figures are abstracted:—



*Deaths from certain specified Causes in the Tormorden Urban Sanitary District for the Three Years 1877-9.*

APP. NO. 1.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

—					Scarlet Fever.	"Fever."	Diphtheria.	Non-spasmodic Croup.
1877	...	...	...	...	17	15	9	13*
1878	...	...	...	...	31	5	3	20*
1879	...	...	...	...	9	7	1	—
					57	27	13	33

\* A fatal form of infectious sore throat, doubtless of diphtheritic character.

After inquiry as to any reasons which have led to scarlet fever cases—probably numbering some 600 during the three years referred to—not having in a single instance been removed to the hospital from amongst a population consisting mainly of the working classes who admittedly are as a rule without proper means of isolation in their own homes, I am inclined to attribute it to two causes.

Probable grounds of such failure:—

In the first instance the Sanitary Authority, having evidence that the spread of scarlet fever was to an important extent due to the intermingling of children, at the elementary schools, with schoolfellows from infected houses, communicated in 1877 with the School Board and the managers of some other elementary schools, asking their aid in ascertaining where the disease was prevalent, with a view to the isolation of the sick and the disinfection of their homes, and they issued to each body packets of stamped post-cards, with certain printed details filled in, so as to enable the schoolmasters and mistresses without trouble at once to communicate to the Medical Officer of Health any absence of pupils believed to be due to infectious disease. The Authority were, however, met with a refusal. Since this occurrence, although I am not informed that it was actually as the result of it, little or no effort has been made to secure isolation in cases of scarlet fever. In May 1880, it is true, nine cases of scarlet fever were admitted into the hospital, but eight of the cases were paupers sent in by the Guardians, four from the Urban and four from the Rural District, and the remaining one was apparently admitted in error from the Hebden Bridge Urban District. Since the refusal of the school authorities to co-operate with the Sanitary Authority, at least one school has been closed on account of the prevalence of scarlet fever disease amongst the pupils.

(a.) Action of school managers.

The second cause relates to the administration of the hospital. In no case does the Sanitary Authority arrange for medical attendance on the patients. The paupers are attended by the Poor Law Medical Officer, and all others must arrange for the attendance of some private practitioner. The bulk of the population consists of the working classes, who pay as little as 2s., or even less, for a medical visit, and as they either cannot or would not pay more for attendance at the hospital, which would, as a rule, involve a journey to and fro of some five to eight miles on the part of the medical practitioner in attendance, the distance of the building from the populous parts of the district tends to hinder its use. In other respects it is not believed that difficulty of access has materially lessened the usefulness of the hospital for the purposes of isolation, because by means of a footpath, which could be used by parents and others anxious to inquire as to the welfare of patients, the journey to the hospital is reduced to something over a mile from the most populous part of Todmorden.

(b.) Medical attendance on patients.

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On the Use and  
Influence of  
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Infectious  
Diseases, by  
Dr. Thorne.

V  
a  
Public Health  
Act, 1875, s. 124.

S  
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Cost of  
hospital.

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Cost of  
maintenance.

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Distribution of  
cost.

Use of hospital  
by Bacup  
Urban Autho-  
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No steps have been taken by the Sanitary Authority to compel removal to the hospital under section 124 of the Public Health Act, 1875; and in only two cases, namely, the two cases of measles admitted in 1879, has any charge been made to the patients or their friends. In these two cases the actual cost of maintenance was charged.

The original cost of the hospital was as follows:—

	£	s.	d.
Purchase of freehold of site and building -	350	0	0
Alterations to and furnishing of building -	586	0	0
Repair of first cottage, disinfecting oven, &c. -	140	0	0
Heating apparatus -	46	5	0
Ambulance -	64	0	0
Repair to and fittings of leased cottage -	25	0	0
Total -	£1,211	5	0

The cost of maintaining the hospital includes the wages of the resident nurse and her husband, who receive 37s. a week when there are no patients in the building, and 30s., together with board, when any cases are under treatment.

During the two years prior to 1878, when the arrangement made with the Bacup Urban Sanitary Authority came into operation, the permanent expenses incurred in maintaining the hospital, excluding interest on original outlay at the rate of four per cent., were some 150l. In 1879 they amounted to 135l. 17s. 6d. made up of the following items:—

	£	s.	d.
Rent of leased cottage -	4	0	0
Heating and lighting -	13	13	0
Repair of ambulance -	14	10	0
Sundries -	2	4	0
Wages to nurse and her husband, together with sundries required by them -	101	10	6
	£135	17	6

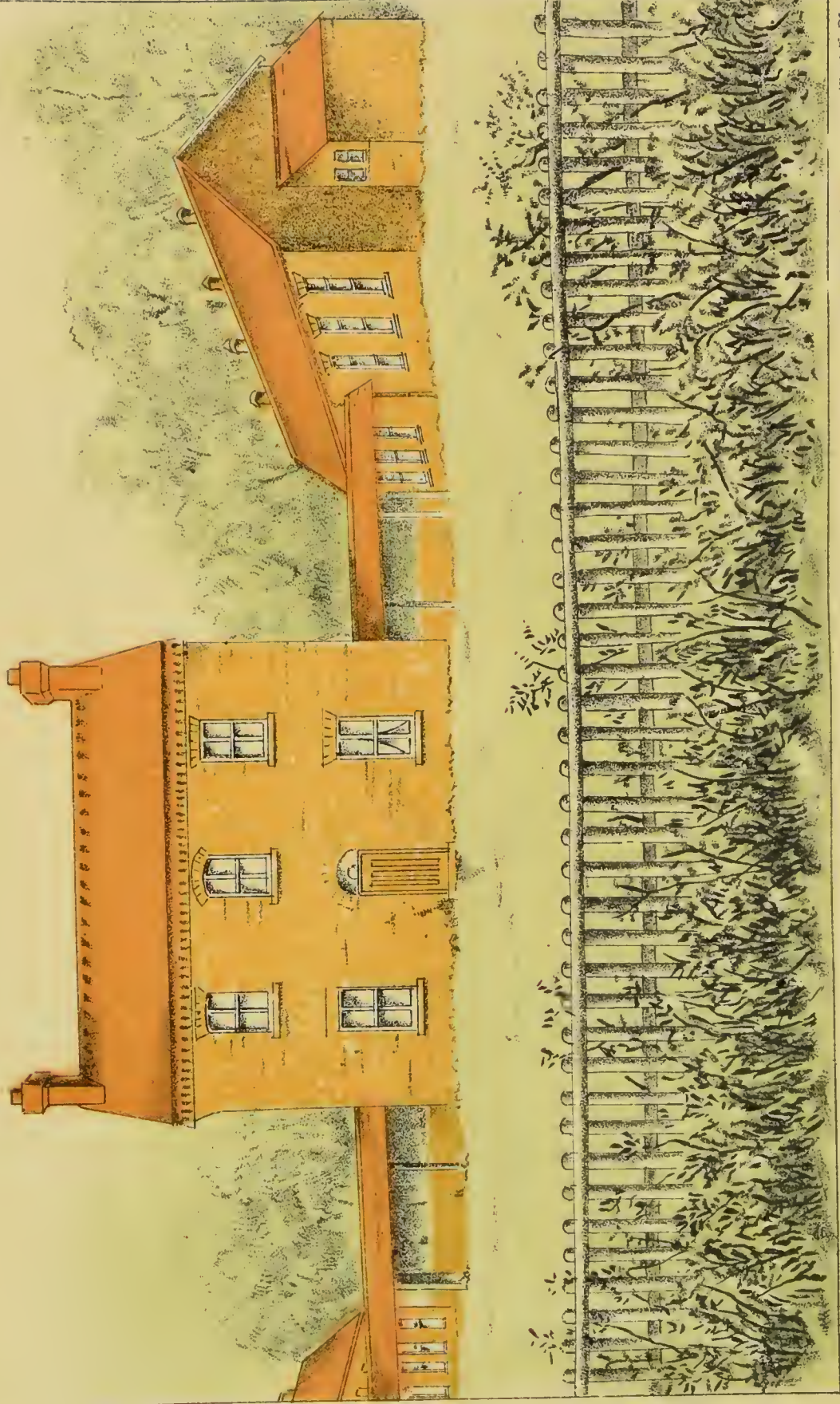
Of this sum, however, a share of the permanent expenses, together with a rental of 40l., amounting together to 97l. 9s. 3d., were paid by the Bacup Urban Sanitary Authority, reducing the total cost to the Todmorden Authority to 38l. 8s. 3d.

The use of the hospital by the Bacup Urban Authority has, as already explained, been limited to two cases of small-pox. With regard to this, I am informed by the Medical Officer of Health that a refusal has always followed any suggestion as to removal to hospital, and that in a recent epidemic of scarlet fever no action was taken to secure isolation, because the prevalence of the disease was at first only learnt through the returns of death, and as soon as this information was obtained, it was found that there were already "so many centres of infection that it was not practicable to send all the cases to the hospital."

The population of the Bacup Urban Sanitary District is estimated at 30,000. Bacup town is about three miles from the building, other parts of the district being some five miles from it; and so far as medical attendance at the hospital is concerned, Bacup is similarly circumstanced to Todmorden.







To face page 265

HOSPITAL FOR INFECTIOUS DISEASES.  
TONBRIDGE URBAN DISTRICT.

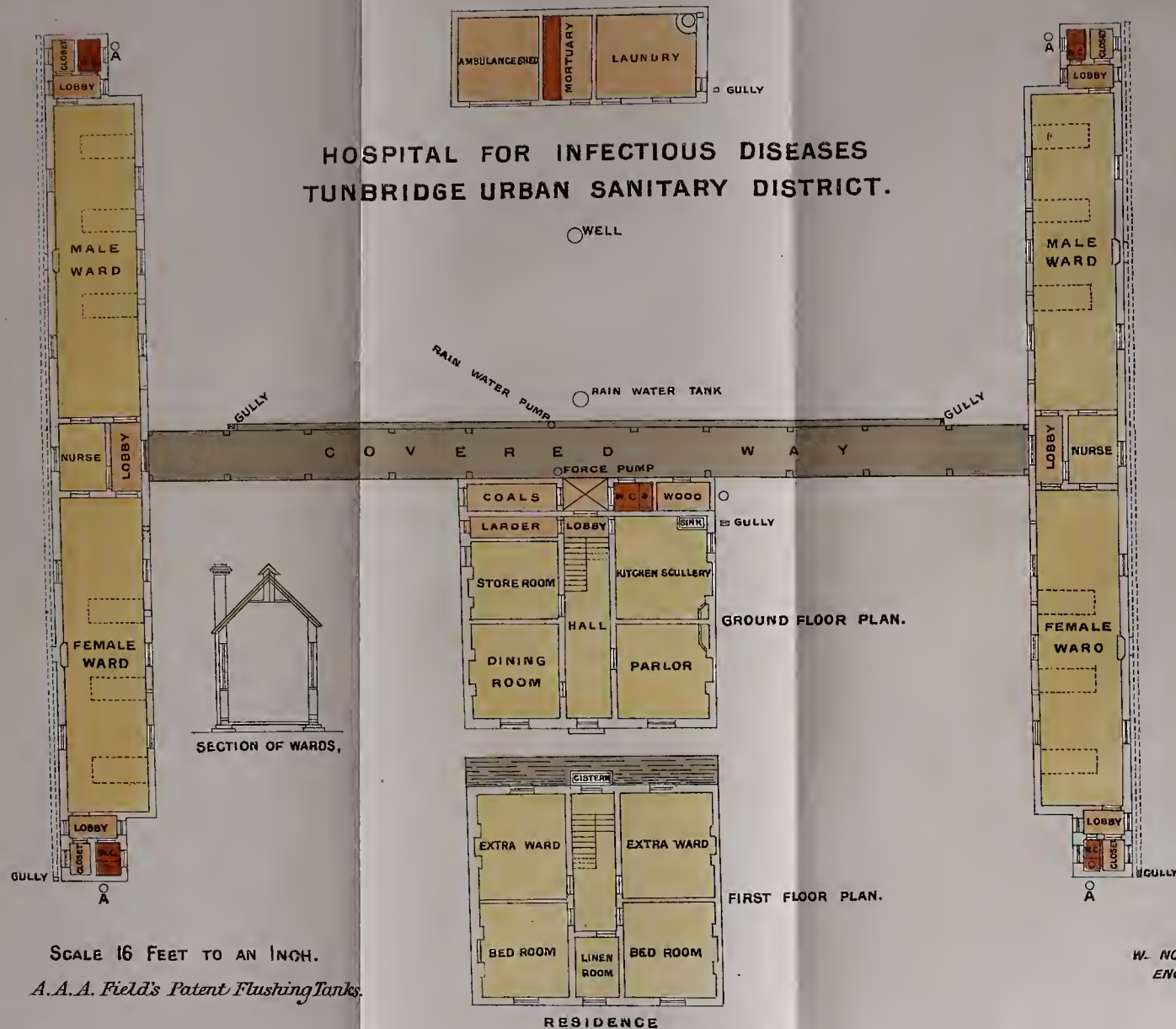
*From a Photograph.*

E. Weller & Grahams, Ltd. 1267.5.01.





# HOSPITAL FOR INFECTIOUS DISEASES TUNBRIDGE URBAN SANITARY DISTRICT.



SCALE 16 FEET TO AN INCH.

*A.A.A. Field's Patent Flushing Tanks.*

W. NOOT  
ENGINEER  
OCT. 1880.



In addition to the cottage adjoining the hospital block, several cottages lie in the neighbourhood of the hospital, the nearest being under 40 feet from the hospital building. In no instance, I am assured, has there been a case of infectious fever in any of the cottages since the hospital was opened in 1874.

#### TONBRIDGE URBAN SANITARY DISTRICT.

Population in 1881, 9,340. Rateable value, 43,000*l*.

In 1878 small-pox became epidemic in Tonbridge, 69 cases coming within the notice of the Sanitary Authority. No hospital for infectious diseases being available, two cottages were hired, and these were later on supplemented by the erection of some wooden sheds. On the termination of the epidemic, the Authority erected the existing hospital, which has only recently been completed. It is locally styled the "Isolation Hospital." The site is known as the "Seven-acre Wood," it being a small wood or copse, covering seven acres, lying one mile to the south of the town of Tonbridge, and just outside the urban district. The soil is sandstone, covered with about 4 feet of loam and chalky shale. In the centre of the copse, and at a distance of about 350 feet from the main road a space of some 3½ acres has been cleared and partly levelled for the purposes of the hospital, the buildings composing which occupy a somewhat elevated position, and command an extensive and most picturesque view. A road has also been constructed from the highway through the wood up to the hospital. This roadway and about one acre in the immediate vicinity of the hospital is fenced with an open wooden railing.

The hospital buildings were designed by Mr. William Noote, C.E., the town surveyor, acting in co-operation with Dr. C. O. Baylis, Medical Officer of Health for the West Kent Combined District; they consist of an administrative block, which occupies a central position, and which communicates by means of a covered passage open at the sides, with two ward pavilions, lying one on either side; there are also certain out-buildings. (See Plates, Nos. XXXVIII. and XXXIX.)

The Administrative Block is a substantial red brick and tiled two-storied building, having a southern aspect. On the ground floor are two sitting rooms, one for the carekeeper and one for nurses, a kitchen, scullery, larder, store-room, coal and wood stores, and a well-ventilated watercloset, which is reached from without. On the upper floor are four bedrooms and a linen room. All the dwelling-rooms have double-hung sash windows and open fireplaces.

The Ward Pavilions are constructed of similar materials, the walls being 11½ inches in thickness, including an air space of 2½ inches between the bricks; the inner shell is of hollow bricks. Each pavilion contains two wards, lying on either side of an entrance lobby and a nurse's room, the latter being provided with fixed windows, commanding a view of both wards. All the wards measure 40 feet in length and 10 feet 6 inches in width; the narrowness being due to the use of some roofing already in possession of the authority. The height from the floor to the wall plate is 13 feet; that to the ceiling 15 feet. The centre of the ward rises for 2 feet with the roof, the total cubic capacity being 6,000 feet.

There are three beds in each ward, or a total of 12 in all; each bed thus has 140 feet of floor space and 2,000 cubic feet. Owing to the narrowness of the wards, which was specially designed so that the patients might not have fellow sufferers constantly in view, the beds all stand with their heads to the same wall.

The wards have each five double-hung sash windows, three on one side and two in the opposite wall. Each window reaches to within 18

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On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Influence of hospital on surrounding neighbourhood.

Site and soil.

Hospital buildings

Ventilation and warming.

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On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

inches of the wall plate, and has a superficial area of 21 square feet; the window surface thus bearing the proportion of nearly exactly one square foot to every 60 cubic feet of ward space. On one side of each of the wards there are ventilating grates measuring 12 inches by 9 inches just above the floor level, and in the ceiling are two double tube ventilating shafts opening above the roof. In the centre of one wall and thus facing the central window in the opposite one is an open fireplace into which has been fixed an American Sylph stove. This stove is stated to heat the ward both adequately and economically. On the inside the walls have been pointed and whitewashed.

At the end of each ward is a watercloset and a closet for pails, &c., both being provided with means of cross-ventilation and being separated from the wards by a lobby similarly ventilated. The drain inlets for ward slops are outside the building. "Field's flush tanks" are placed at the head of every drain. The outfall for the drains is on to a piece of land in the copse; this arrangement is however only a temporary one. Water is derived from a well sunk to some depth into the sandstone, the supply being pumped into a tank from which a constant supply is provided to all parts of the buildings; a rain-water tank is also provided.

The out-buildings are of wood on brick foundations, the roofs being tiled. They contain a laundry, mortuary, and an ambulance shed. No proper ambulance or disinfecting stove have as yet been provided.

Administra-  
tion.

At the date of my visit in August 1880, the hospital had not been open many months, and only two patients had been admitted, one a labouring man suffering from enteric fever, the other, a domestic servant, suffering from scarlet fever. The general administrative control of the hospital is in the hands of Dr. Baylis; the Inspector of Nuisances having immediate charge of the buildings and their management. No regulations have as yet been laid down as to the terms and conditions on which patients are to be admitted. A care-taker and his wife reside in the administrative block. The care-taker is an employé of the Urban Authority, and lives at the hospital rent free. When patients are under treatment he retains his wages, which amount to 18s. a week, together with board for himself and his wife, and they both give their entire services to the hospital.

Cost of con-  
struction, &c.

The site is held on a 21 years' lease at a rental of 15*l.* a year. The cost of the erection of the hospital building, excluding the value of some materials formerly belonging to a temporary hospital, but including cartage for all materials from Tonbridge, was as follows:—

	£	s.	d.
Cutting and clearing wood on site	-	-	70 10 11
Building hospital and administrative block	-	1,085	2 0
Building ambulance shed, laundry, &c.	-	34	10 0
Fencing in ground; labour, &c.	-	29	11 0
Furnishing and fitting	-	174	0 0
	<hr/>		
	£1,393 13 11		
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#### TYNE PORT SANITARY DISTRICT.

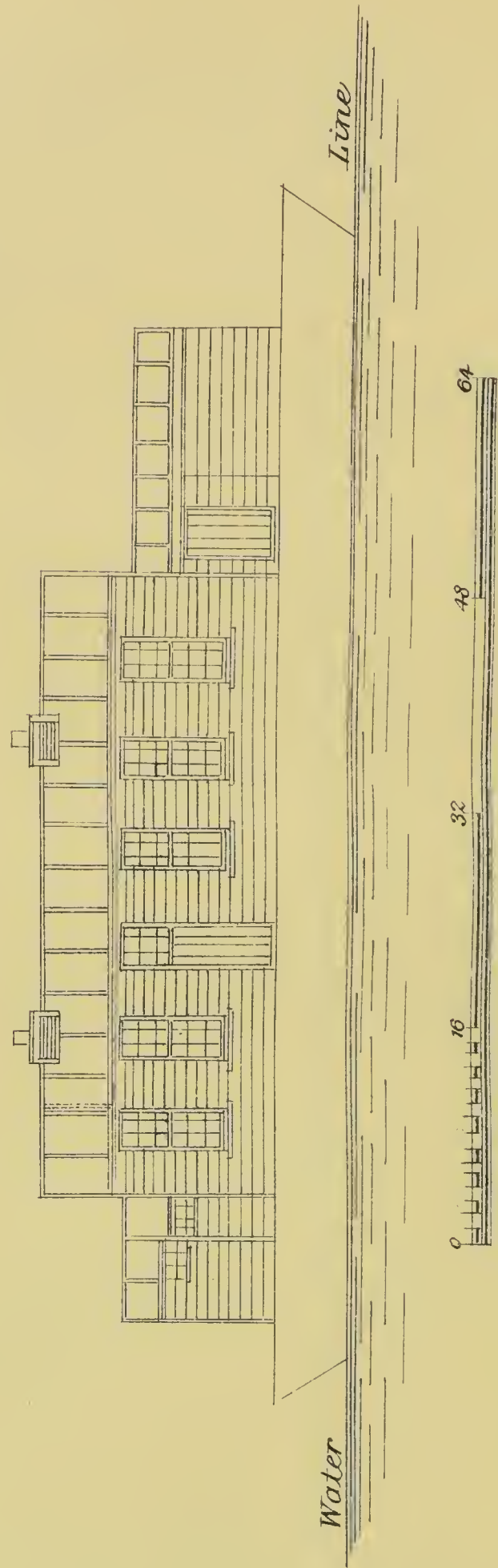
Construction  
of hospital.

The hospital belonging to the Tyne Port Sanitary District is built on a "keel," formerly a steam ferry-boat, which is moored off Jarrow Slake with large wooden fender-boards projecting fore and aft to avoid collisions, about two miles above the mouth of the Tyne. It was con-





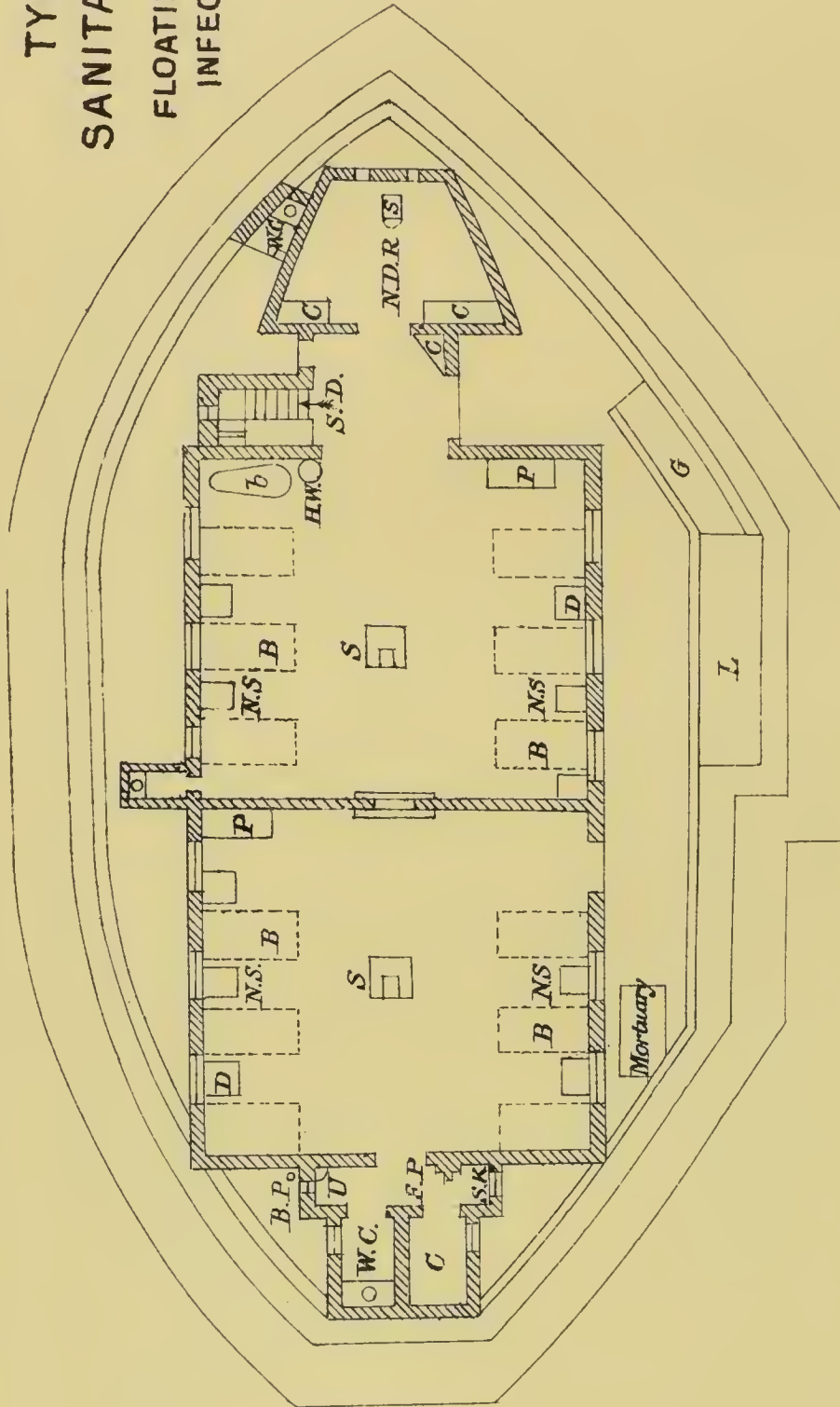
TYNE PORT SANITARY DISTRICT.  
FLOATING HOSPITAL FOR INFECTIOUS DISEASES.







TYNE PORT  
SANITARY DISTRICT  
FLOATING HOSPITAL FOR  
INFECTIOUS DISEASES.



B.B. Beds. C. Cupboard. D. Drawers. F.P. Force-pump.  
B.P. Bulge-pump. G. Gangway. L. Landing.  
H.W.C. Hot Water cistern. N.S. N. S. N. S. N. S. Night stool.  
N.D.R. Nurses day-room. P. Press. S. Stoves. U. Urinal.  
S.D. Stairs down, W.C. Water-closet. S.K. Sink. b. Bath.





structed about 13 years ago, although it has been added to and improved since that date, and on the formation of a Port Sanitary Authority, it passed into their hands. On the main deck stands a double-walled wooden building, having a zinc roof lined with wood. This building consists of two wards, each containing six beds and measuring 22 feet in length and 23 feet 6 inches in breadth. The ceiling rises with the roof, but it has an average height of about 15 feet, thus giving each ward about 7,590 cubic feet. These wards can be made to open into each other, and they can also be completely separated by closing a door situated in the partition wall and fitted with india-rubber padding. Both wards have separate entrances from the main deck; they are each provided with six sash-windows, opening top and bottom, three being situated on either side. A cross current of air is thus ensured, and a louvred roof affords additional means of ventilation. The wards are heated by central stoves, and are fitted with hot and cold water apparatus. They are provided with a movable bath, and also with water-closets and lavatories, which are efficiently ventilated and sewered from the wards by means of a cross ventilated lobby, the water supply to the closets being derived from a tank filled from the river by means of a force-pump on deck. The wards are neatly and comfortably fitted and furnished. At one end of the vessel is a nurse's day room, communicating with one of the wards by means of a covered passage. A nurse's watercloset, and a mortuary to hold one body, are also on the main deck. (See Plates, Nos. XL. and XLI.)

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On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Below, and in the centre of the vessel, is a kitchen with excellent cooking and hot-water apparatus and all culinary appliances. Forward is a mess room for nurses and the ship-keeper's bedroom. Aft, are two nurse's bedrooms, a pantry, and a storeroom for clothing, &c.

A second and smaller "keel" than the one on which the hospital is built is moored alongside, the two communicating by means of a gang-way. On this keel is erected a wash-house and laundry, in which is also placed an iron tank for disinfecting purposes. The latter can be heated to a certain extent, and sulphur is always burned in it when clothing and other articles are being dealt with. On this keel is a rain-water tank and a force pump that can be used to pump rain-water either into the boiler or to the hospital. Fresh water is brought to the hospital by means of a water boat.

Laundry,  
disinfecting  
stove, &c.

The following cases have been admitted during the three years 1877-79:—

Admission of  
patients.

—					1877.	1878.	1879.
Enteric fever	...	...	...	...	2	2	2
Typhus fever	..	...	...	...	—	—	4
"Fever"	...	...	...	...	—	3	—
Small-pox	...	...	...	...	1	2	3
Totals	...	...	...	..	3	7	9

One patient, namely, one suffering from small-pox, was in hospital at the date of my visit.

On one occasion only has the hospital been full, this being in the spring of 1875, when enteric fever prevailed on board the "Wellesley" training ship. Sixteen of the cases were then admitted.

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Administrative  
staff, current  
expenses, &c.

The permanent resident staff of the hospital consists of a male ship-keeper and his wife. The ship-keeper receives 1*l.* 1*s.* a week; he has general charge of the hospital, and has to go ashore in a boat to fetch supplies; it being a condition that when any patients are in hospital he shall change his clothes before starting. His wife acts as nurse, and is paid 12*s.* a week. When any patients are on board, extra help in the shape of a maid is given, together with a further allowance of 4*s.* a week for the nurse, and 1*s.* 6*d.* a day as board money for every person in the vessel. The administrative control of the hospital is in the hands of the Medical Officer of Health to the Port Authority, and he is expected to give medical attendance to all patients admitted, the remuneration for this being deemed to form a part of his salary as Medical Officer of Health. A charge of 3*s.* per day per patient is made by the Port Sanitary Authority, the master of the vessel having to guarantee the payment on behalf of the owner of the vessel. In only one instance, and this of recent date, has any difficulty occurred in securing this payment. In the case referred to, an owner, after the convalescence of the seaman removed to the hospital, refused to be bound by the guarantee given by the master of the vessel.

Quarantine  
ground.

There are times when some little difficulty occurs in connexion with the administration of this hospital. On more than one occasion the ship-keeper has been unable for several consecutive days to go ashore in a boat belonging to the hospital ship on account of the severity of the weather. Fortunately there were no patients on board at this time. On one occasion also the Medical Officer of Health was for a similar reason obliged to obtain the services of a steamer in order to visit a patient then under treatment. A steamer can, however, always be procured under circumstances such as these, and which are but of rare occurrence.

Close to the floating hospital a quarantine ground is marked off by buoys. In this ground vessels which have entered the river are at times obliged to wait the visit of the Medical Officer of Health, and on one occasion a vessel containing a cargo of rags, said to have been collected in South-Eastern Russia where levantine plague was then prevalent, was moored at this point until, under the directions of the Privy Council Office, the rags had been submitted to a process of "disinfection." This process, I am informed, consisted of opening up each bale separately and of submitting its contents to a spray of carbolic acid.

Cost of con-  
struction and  
maintenance.

The original cost of the hospital and its furniture was 1,040*l.* The second keel, together with the "disinfecting oven" and the force-pump, cost an additional 280*l.* The present Port Sanitary Authority has only been in existence for about 12 months, and from an examination of the accounts incurred for the year ending 31st March 1880, it would appear that the following belong to the hospital:—

	£	s.	d.
Expenses connected with alteration and repair of the buildings - - - - -	30	12	2
Costs of patients, including wages - - - - -	96	0	6
Water and coals - - - - -	11	0	6
Total - - - - -	£137	13	2

Of this amount, however, 30*l.* 16*s.* was repaid to the Port Authority by owners or masters of vessels, thus reducing the total sum to 106*l.* 17*s.* 2*d.*



# TYNEMOUTH URBAN SANITARY DISTRICT.

APP. NO. 1.

Population in 1881, 43,863. Rateable value (1879), 166,000*l*.

Owing to the prevalence of cholera in 1866, and the danger of its being imported into this district, situated, as it is, at the mouth of the Tyne, a double-walled wooden hospital was at that date erected by the Sanitary Authority. Since then it has been a good deal enlarged, and it is now a somewhat irregular wooden building. The two sets of boards forming the walls are about five inches apart, the intervening space being filled in with sawdust. The building is rooled with slate and stands on brick foundations. It occupies about half an acre of land in a fairly isolated position just outside and to the east of the town of North Shields, which is by far the most populous part of the borough of Tynemouth. The site is on the northern bank of the Tyne, near its mouth; indeed it is so near a precipitous cliff, which consists of sand, with here and there a little clay, and which is so much undermined by the tide as to lead to frequent and extensive land-slips, that it may shortly be necessary to remove the hospital.

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.

Origin of the hospital.

Site and soil

The building consists of certain administrative rooms, viz., a kitchen and a nurses' room, which, together with an entrance lobby, occupy a fairly central position. This accommodation is, however, defective, and when an assistant nurse is employed she is obliged to sleep in the kitchen. To the east of these rooms is a passage leading to the outer air, and beyond this a ward for females which contains four beds, but has only a cubic capacity of 3,525 feet, and a floor space of 300 square feet. To the west of the kitchen, and communicating with it by means of a passage, is a male ward, which contains four beds and has a cubic capacity of 6,020 feet, and a floor space of 515 square feet. Beyond this ward, and opening into it is another male ward, intended for a single patient; it has a cubic capacity of 3,290 feet, and a floor space of 280 square feet. Another room beyond this can also be occupied as a ward. The wards are ventilated by means of openings beneath the beds, and by means of a perforated zinc tube open at either end and fixed at the level of the ceiling; the tube is, however, not so fixed as to exclude rain from finding its way into the wards. The building is supplied with waterclosets, themselves well ventilated, and also separated from the wards by means of cross ventilated lobbies. There is a fixed bath at the male end, and a movable one at the female end. The wards are heated by open fireplaces. There is no direct communication between the interior of the building and the drains except in the case of the waterclosets, the soil-pipes of which are fitted with small "ventilating shafts." The drains, which are provided with ventilating shafts rising above the level of the roof, communicate directly with the town system of sewers. Water is laid on from the town service.

Hospital buildings.

In addition to the main building there are three detached blocks; one for a wash-house, one for a mortuary, and one for an ambulance shed. The latter contains an old cab, which is used at times for bringing patients to the hospital, and when so used an attempt is made to "disinfect" it. Ordinary public cabs, however, appear to be most frequently used for this purpose.

There is no stove or other means of disinfection maintained at the hospital.

The grounds around the hospital are entirely neglected, and have a desolate appearance.

Ever since 1866 a nurse has been in residence at the hospital, and it has been kept ready for use. The number of cases admitted since 1871, and the diseases from which they have suffered, has been as follows:—

Admission of patients.

APP. NO. 1.  
On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne

—				Small-pox.	" Fever."	Scarlet fever.	Other diseases.	Totals.
1871	...	...	...	82	6	—	—	88
1872	...	...	...	25	3	—	—	28
1873	...	...	...	2	4	—	—	6
1874	...	...	...	2	6	5	2	15
1875	...	...	...	—	3	—	—	3
1876	...	...	...	1	—	—	2	3
1877	..	...	...	—	2	—	1	3
1878	...	...	...	—	3	1	—	4
1879	...	...	...	1	—	1	—	2

Status of  
patients.  
Paupers, &c.

It will thus be seen that apart from small-pox cases this hospital has not been much used, and this notwithstanding the fact that the Sanitary Authority receive pauper cases other than those attacked with infectious diseases in the workhouse itself. In 1879 scarlet fever was very prevalent in the borough, but only one case was received into the hospital. Nearly all the patients admitted have either been paupers or have been on the verge of pauperism, the exceptions being, as a rule, seafaring men who have been found to be suffering from infectious fevers in lodging-houses. But little attempt appears to have been made to secure isolation amongst the labouring classes or small tradesmen, with a view of staying the spread of infection amongst their families or their customers. How far the reception of paupers has prevented any such use of the hospital is not known; it is, however, stated that when ships' captains have occasionally been admitted they have made no comment on the subject. Such patients, however, often use the "private ward." No proceedings have been taken under section 124 of the Public Health Act, 1875.

Repayments  
to Sanitary  
Authority.

Payment for admission is invariably asked, although in certain instances where the patients were obviously too poor to afford the amount demanded, it has not been insisted on. The sum charged is 3s. a day, whether the patients are paupers or not, and 5s. a day if the private ward is used. Fees for medical attendance are, however, charged in addition, unless the patients are paupers, in which case one of the two poor law medical officers for the borough attends in his official capacity.

Cost of con-  
struction and  
maintenance.

The hospital originally cost 250*l.*, and the fittings and furniture a further sum of 150*l.* The site is only subject to a nominal rental of 2*s.* 6*d.* a year. The average annual expenses for maintaining the hospital, including wages and repairs, for the four years ending March 1879, were 86*l.* 2*s.* 0*d.*, and the average yearly amount repaid to the sanitary authority by the guardians and by patients during the same period has been 16*l.* 14*s.* 0*d.*

WALSALL URBAN SANITARY DISTRICT.

Population in 1881, 58,808. Rateable value, estimated, 143,000*l.*

Hospital  
buildings,  
site, &c.

A hospital for infectious diseases was erected for the borough of Walsall in 1872, on an isolated site of one acre in extent, situated to the north and just beyond the inhabited portion of the town. The nearest houses to the premises, which are enclosed by a brick wall, stand at a distance of 245 feet to the east, and 430 feet to the west. The main building consists of a central portion containing the entrance hall, kitchen, two nurses' bedrooms, and certain administrative offices, and communicating directly with two large wards on the north, and two smaller ones on the south. The outer walls consist of two layers of brickwork 4½ inches in thickness, and of an intervening space 2 inches wide. The two large wards are separated from each other by a nurse's sitting room, having a fixed window opening into each ward, a surgery



and a stove-room, a passage between these rooms affording means of communication between ward and ward. These wards are 45 feet in length and 22 feet broad, and of an average height of 12 feet 6 inches, the ceiling only being flat for about 10 feet in the centre. Each ward contains 12 beds, giving only 83 feet of floor space, and about 1,030 cubic feet to each bed. Both the wards are divided into three compartments by means of a permanent division which can be left open or closed in the centre by sliding doors running on wheels. Each compartment contains four beds and two lavatory basins, the waste-pipe from which passes direct into the hospital drain.

At the end of each ward, but not separated from it by a cross-ventilated lobby, are a watercloset and a sink. The wards themselves are provided with six casement windows measuring 5 feet in height, and 3 feet 9 inches in width, three being on either side. There is also a circular window near the ceiling at the end of each ward. In addition to the means of ventilation afforded by the windows, there are openings in the ceiling which communicate with the outer air by the "crest tiles" of the roof being raised above the others, and special openings in the walls. This latter arrangement is effected by openings in the outer wall a little above the level of the surface; these openings communicate with separate spaces about 4 feet wide and 8 feet high, between the brickwork of the walls, and the fresh air they contain passes into the wards by gratings 9 feet above the floor level. The outer air, however, on reaching the ward falls at once towards the patients, and the consequence is that all the openings in the outer side of the walls have been blocked with cement. The two smaller wards open into each other by means of a short passage, they are only partially provided with means of cross-ventilation, having windows at one side and at the end; they each contain 652 superficial feet and 9,910 cubic feet, and hold eight beds. Each bed thus has 81 square feet and 1,240 cubic feet. Both sets of wards are heated by means of hot-water pipes, and the smaller ones have, in addition, open fireplaces. In a detached building are: 1°, a wash-house; 2°, a laundry; 3°, an ambulance shed containing a light wooden ambulance, roofed with canvas, and fitted with a stretcher; 4°, a mortuary; 5°, a disinfecting chamber. The latter is constructed partly of brickwork, partly of iron, and it is fitted with an iron hand-cart which can be wheeled into the chamber, together with the articles to be disinfected. The chamber is heated by means of a furnace, but I could not ascertain the temperature to which it could be raised without risk of damaging the articles which may be dealt with in it. The water from the South Staffordshire Waterworks is laid on to the buildings, and the drains join the main sewer of the borough, a "siphon" bend being inserted in the principal outfall drain of the building. There is, however, no ventilating opening in the hospital side of the "siphon" bend.

This hospital was designed and erected in 1872 by the borough surveyor owing to a prevalence of small-pox. It was commenced on the 28th of May, and was opened on the 18th of July. During the remainder of that year 35 small-pox patients were admitted, and in the following years, 4, 8, and 16 patients were received suffering from the same disease. From April 1875 up to the date of my visit the hospital had not been used. Indeed, for some reason, which it is difficult to understand, it had not been considered desirable to use it for the purpose of isolating any disease except small-pox, and even in 1878 and 1879 when an epidemic of scarlet fever prevailed in the borough, causing as many as 246 deaths, it was during the first of these years determined that "no practical benefit could arise" from utilising the hospital as a means of isolation. On the occasion of my visit it was resolved, at

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Use of hospital  
limited to  
small-pox.



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a conference of certain members of the Urban and Rural Sanitary Authorities of Walsall, and of some of the guardians of the Walsall Union, that subject to the assent of those bodies the management of the hospital should be handed over to the Rural Sanitary Authority of the Walsall Union on condition that cases of infectious disease should be admitted into it from the borough, and that, subject to certain restrictions, the building should be used by the poor law guardians for the isolation of any infectious fevers occurring amongst the pauper class. The resolution was afterwards submitted to the authorities in question, but it was not adopted.

Cost of con-  
struction and  
maintenance.

The original cost of the hospital was 2,196*l.* 5*s.* 10*d.* as under:—

		£	s.	d.	£	s.	d.
(a.)	Cost of site (one acre)	-	-	380	0	0	
	Levelling, fencing, &c.	-	-	25	17	9	
							405 17 9
(b.)	Cost of building	-	-	1,339	9	11	
	„ heating apparatus	-	-	74	8	8	
	„ disinfecting chamber	-	-	39	0	6	
							1,452 19 1
(c.)	Furnishing	-	-	-	-	-	337 9 0
	Total cost at time of opening	-			£2,196	5	10

In the 12 months ending December 31st, 1879, during which the hospital stood empty, the ordinary expenses including rates and taxes, together with fire insurance, premium, &c., amounted to 22*l.* 8*s.* 1*d.* A man and his wife in charge of the premises live there rent free, but receive no payment.

#### WARRINGTON URBAN SANITARY DISTRICT.

Population in 1881, 41,456. Rateable value, 129,673*l.*

Site and soil

The hospital for infectious diseases for the borough of Warrington was opened in May 1877, since which date, however, the amount of accommodation available has been materially increased. The site consists of a somewhat irregular oblong, having throughout a width of 195 feet, and an average length of 360 feet; in all somewhat over 1 $\frac{3}{4}$  acres. It is situated towards the western extremity, and somewhat over half a mile from the centre of the borough, and is approached from Aikin Street, at the northern extremity of which it lies, and to which further reference will be made. The other three sides consist of land as yet not built on. The soil is sand some 12 feet deep, overlying clay.

Hospital  
buildings

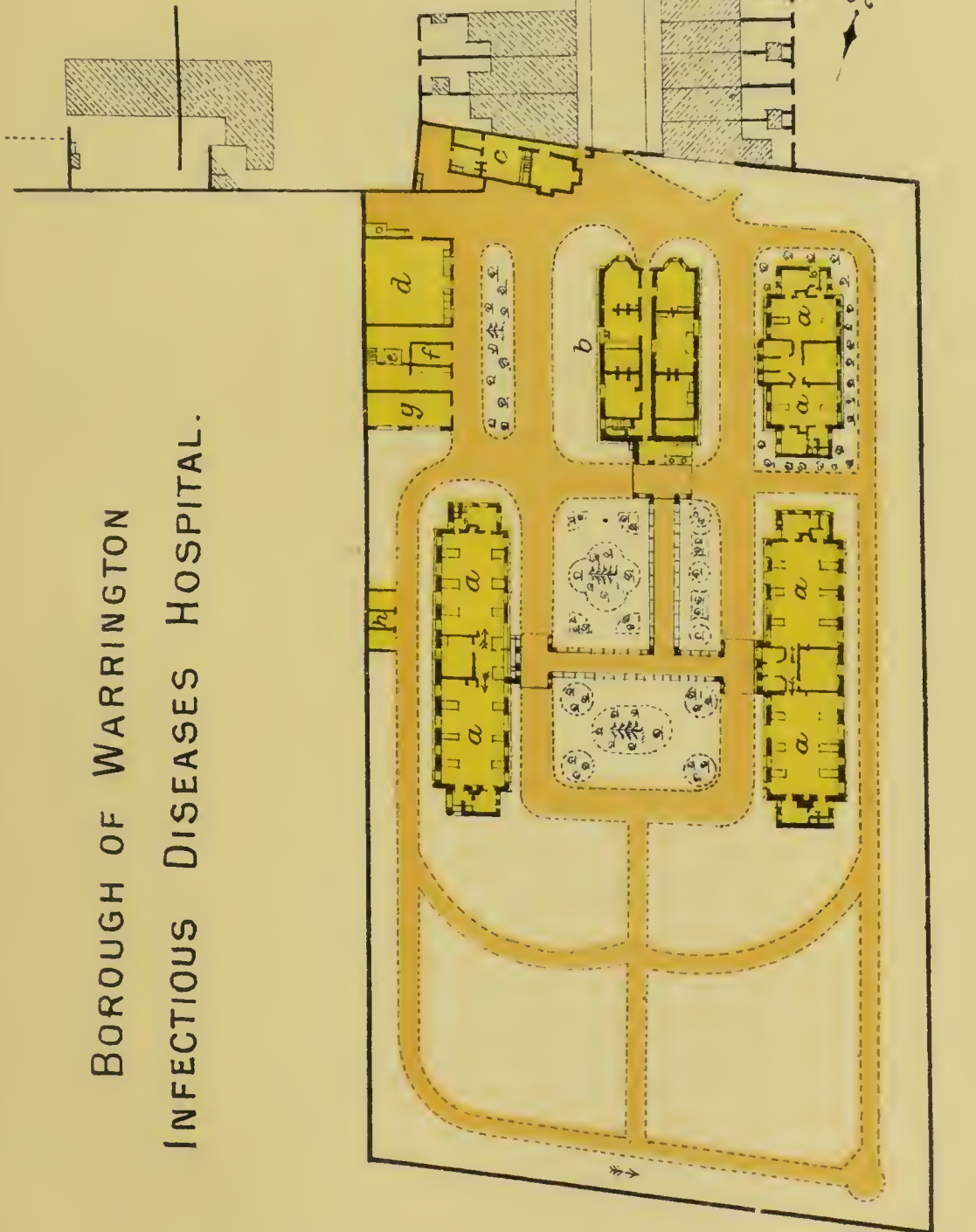
The present buildings, together with that part of the recreation ground enclosed by them, cover about two-thirds of the site, leaving a space at its northern extremity for such further extensions as may hereafter be found necessary. They include 1<sup>o</sup>, an administrative block; 2<sup>o</sup>, two ordinary ward-pavilions which are connected with the administrative block by means of a covered passage open at the sides; 3<sup>o</sup>, a special pavilion containing two small wards; 4<sup>o</sup>, a lodge which is built close to the hospital entrance in Aikin Street, and is indeed in actual contact with one of the houses in that street; 5<sup>o</sup>, two groups of out-buildings; one containing a laundry, disinfecting chamber, ambulance-shed, mortuary, and store for wood, coals, &c.; the other containing two van-sheds and a store for garden tools, &c. (See Plates, Nos. XLII. to XLVI.)

The administrative block is a substantial two-storied building consisting of brick with stone ornamentation, and resting on a bed of concrete. All the external walls are 16 inches thick, including a 2-inch

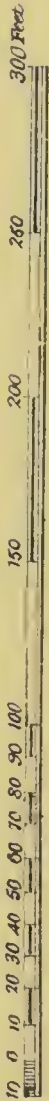


# BOROUGH OF WARRINGTON INFECTIOUS DISEASES HOSPITAL.

- a. wards.
- b. administrative building
- c. lodge.
- d. laundry.
- e. disinfecting stove.
- f. ambulance shed.
- g. mortuary.
- h. van-house, tool shed &c.



SCALE

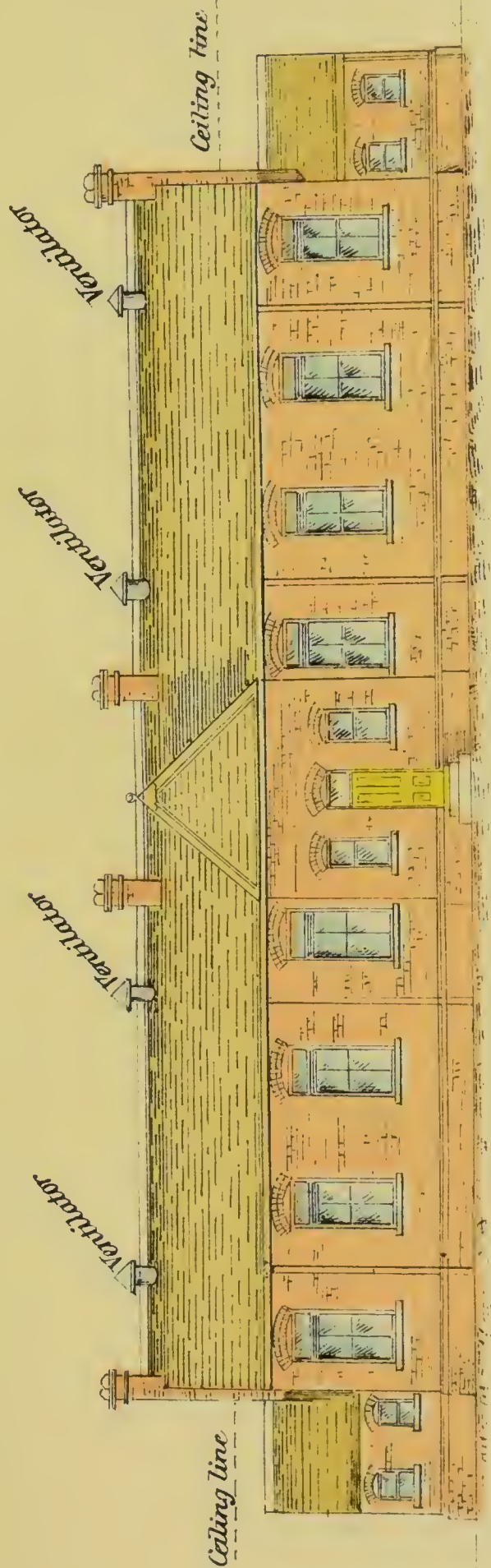


This. Longdin  
Borough Surveyor.





# BOROUGH OF WARRINGTON. INFECTIOUS DISEASES HOSPITAL.



ELEVATION OF A TWELVE BED PAVILLION.

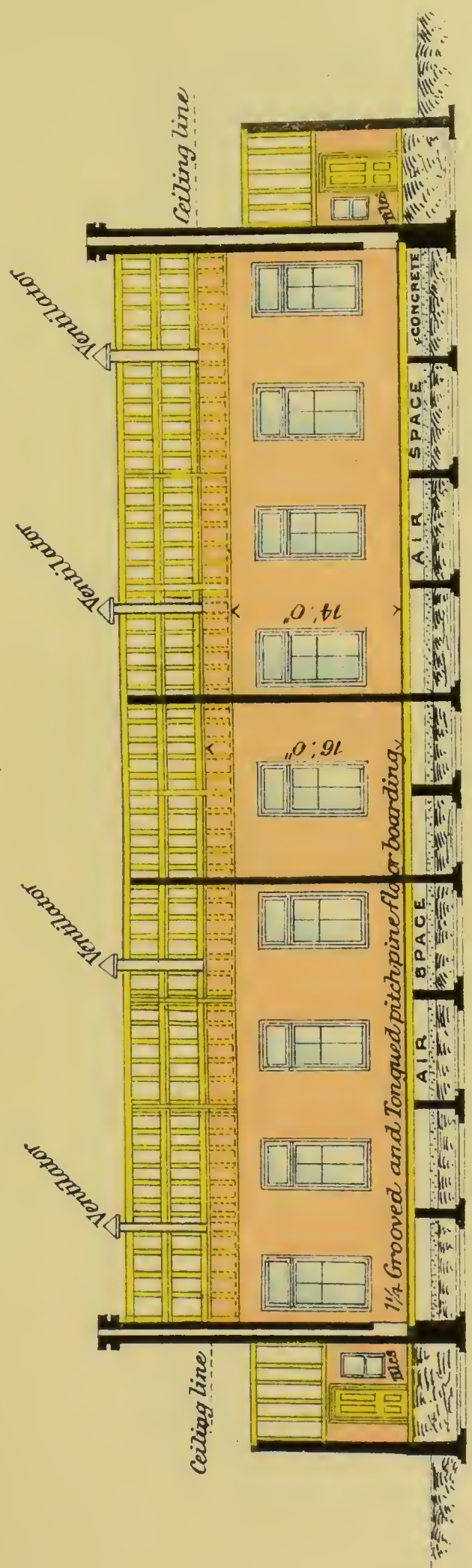
SCALE 16 FEET TO AN INCH.

*Thos. Longdin  
Borough Surveyor.*





BOROUGH OF WARRINGTON  
INFECTIOUS DISEASES HOSPITAL.



LONGITUDINAL SECTION OF A TWELVE BED PAVILLION

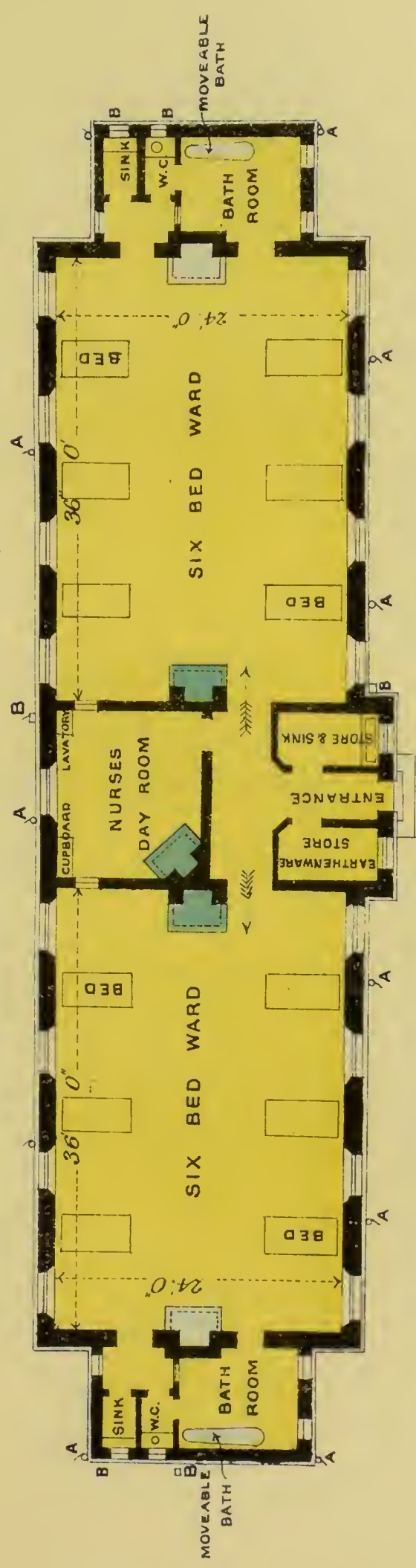
SCALE 16 FEET TO AN INCH.

*Ths. Longdin,  
Borough-Surveyor*





# BOROUGH OF WARRINGTON. INFECTIOUS DISEASES HOSPITAL.



PLAN OF A TWELVE BED PAVILLION

Scale 16 Feet to an Inch.

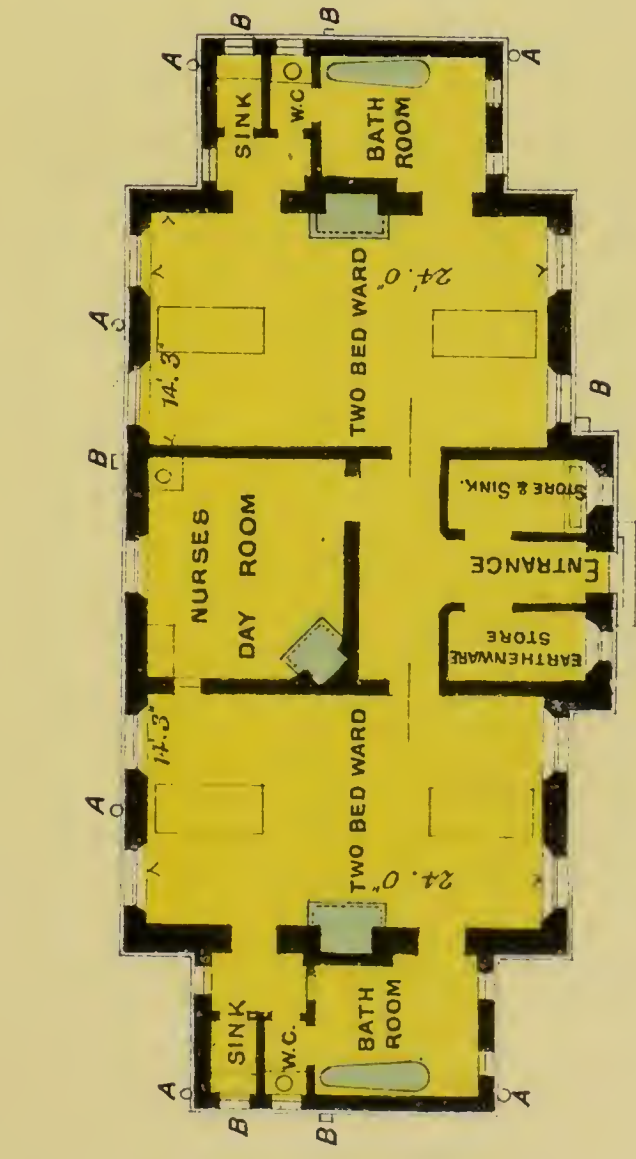
A. Down Spouts delivering on trapped Gulleys  
B. Waste Pipes D<sub>o</sub>

Ths. Longdin  
Borough Surveyor.



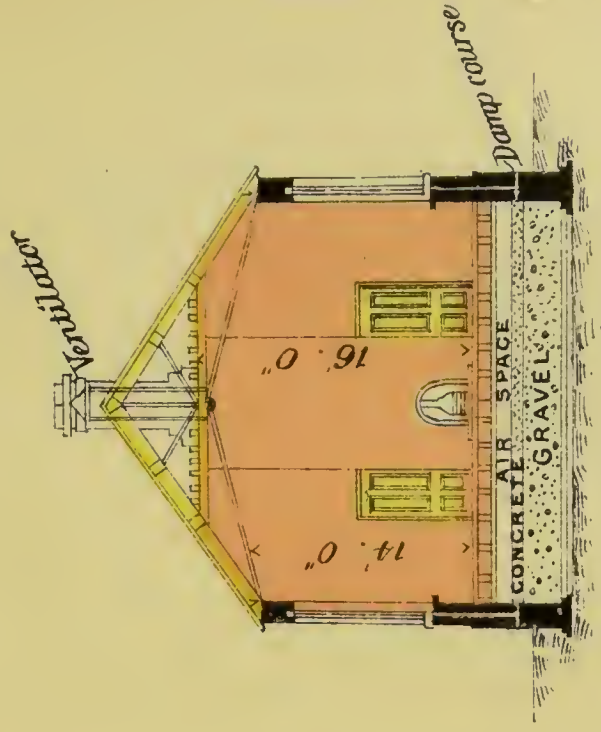


# BOROUGH OF WARRINGTON INFECTIOUS DISEASES HOSPITAL.



PLAN OF A FOUR BED PAVILLION.

SCALE, 16 FEET TO AN INCH



TRANSVERSE SECTION.

A. Down Spouts delivering on trapped gulleys  
B. Waste pipes  
D<sup>o</sup>

*Ths. Longdin  
Borough Surveyor.*





cavity. A well-ventilated corridor runs down the centre of the building on each floor. Downstairs there are; on one side of the corridor, a room for the medical officer, a surgery, a small store-room, and a large room available for stores, but also intended to serve, as occasion may require, as a convalescent room or a playroom for children; on the other side, the matron's room, the kitchen and scullery, and a coal store. Upstairs there are; on one side of the corridor, four bedrooms, namely, single-bedded rooms for night nurses, and double-bedded rooms for day nurses and for servants; and on the other side one bedroom for the matron, and two large rooms available for stores or for any special purposes. Waterclosets for both floors are contained in a projection at the rear of the building; the two closets for the ground floor are entered from without, and on the upper floor a single closet is separated from the main building by means of a cross-ventilated lobby.

The two ordinary wall-pavilions are also both constructed of brick and stone resting on a bed of concrete. The external walls are 16 inches thick, an air space of 2 inches intervening between an outer layer of 9 inches, and an inner one of 5 inches. Each pavilion contains two wards, which are separated in the centre by the entrance lobby, a passage leading from ward to ward, a nurse's day-room having fixed windows looking into each ward, and two small rooms for stores. The nurse's room is fitted with a lavatory, a couch, and a small kitchen range. Each ward is 36 feet long and 24 feet broad. The ceiling rises with the roof to a height of nearly 2 feet above the wall-plate; the remainder, which is ceiled, is 14 feet 6 inches above the floor level. There are 6 beds in each of the four wards in the two pavilions, the floor-space per bed being 144 square feet, and the cubic space varying in the two pavilions from 2,058 to 2,274 cubic feet. Beyond some slender tie-rods there are no surfaces or projections where dust can accumulate. The brick walls are, together with the ceiling, lime-washed at regular intervals. The floor consists of well-seasoned and well-laid tongued and grooved pitch-pine, fitted with an angular rib at its junction with the wall so as to prevent the entrance of dust, &c. at any point where the boards may decrease in length by shrinking. The wards are well lighted. Each ward has eight windows, four in each of opposite side wall. The windows, which consist of three sashes, rise to within 10 inches of the wall plate; two of them on each side are placed within a foot of the two end walls, so as to afford ample light in the corners, and they have in each ward a collective superficial area of 186 square feet, or at a rate of 1 square foot to every 66 cubic feet in one ward, and to every 73 cubic feet in the other. Although in all other parts of the hospital buildings the windows have double-hung sashes opening top and bottom, those in the ward themselves are unfortunately otherwise constructed, the two lower sashes being fixed, a smaller upper one which is hinged alone opening.

The beds occupy the spaces between the ward windows. Beneath each of opposite side wall. The windows, which consist of three sashes, opening in the wall which can, if necessary, be closed by means of a slide; and additional means of ventilation are provided, 1st, by two ventilating shafts, which in each ward rise from the ceiling and pass through the roof, and 2nd, by means of openings into the flues of the fireplaces, which are fixed at either end of the ward. They are open fireplaces, having a cavity at the back into which air is received through a tube carried from without under the concrete bed on which the pavilion stands. In the cavity the air is warmed by passing over a series of iron flanges, and from thence it merges into the ward through an opening



just above the fireplace. These stoves are manufactured by Messrs. Shillito and Shorland of Manchester, and they are stated to maintain a sufficient and fairly equable temperature throughout the wards even when, in cold weather, an amount of fresh air from without, amply sufficing to keep the wards thoroughly sweet, is allowed to enter, either by the means of windows or the fresh air flue. The bedsteads are of iron with a fixed spiral wire mattress. They are neat, cleanly, incapable of retaining infection, and are also stated to be very comfortable. The bedstead is known as the hospital spiral spring-wire bedstead and mattress combined, and is manufactured by Messrs. J. B. Rowcliffe and Co. of Dinting near Manchester. A flock bed, which is periodically stoved in the disinfecting apparatus, is placed over the spring-wire mattress. The furniture, both in the wards and nearly throughout the buildings, is of stained pine, and it is simply but neatly constructed. There is also everywhere an appearance of comfort, together with the most scrupulous cleanliness. (See Plate No. XLVII.)

Opening out from each ward is a projection containing a bath-room fitted with a movable bath, a watercloset, and a ward sink. The bath-rooms open directly into the wards and they contain coils of tubing by means of which the baths can be filled from the bath-room taps after they have been wheeled to the bedside. There are lobbies between the waterclosets and the wards, but their means of cross-ventilation is less complete than it should be.

The "special" ward pavilion is smaller than the other two. In the centre are rooms similar to those in the pavilions, and on either side are two small wards having a floor space of 350 square feet and a cubic capacity of 5,058 cubic feet. Each of these wards contains two beds, there being 175 square feet and 2,529 cubic feet per bed. There are four windows to each ward; two in each opposite side wall. The total window area is 93 superficial feet, or at the rate of 1 square foot to every 54 cubic feet. Opening out from the wards are a bath-room, a water-closet, and a ward sink as in the other pavilions.

There are means of communication by means of a bell between all the wards and the lodge, where a man resides, and whose services might at any time be required, as in case of a violently delirious patient.

The hospital contains 28 beds in all, and it affords accommodation for the simultaneous treatment of patients of both sexes suffering from three infectious fevers.

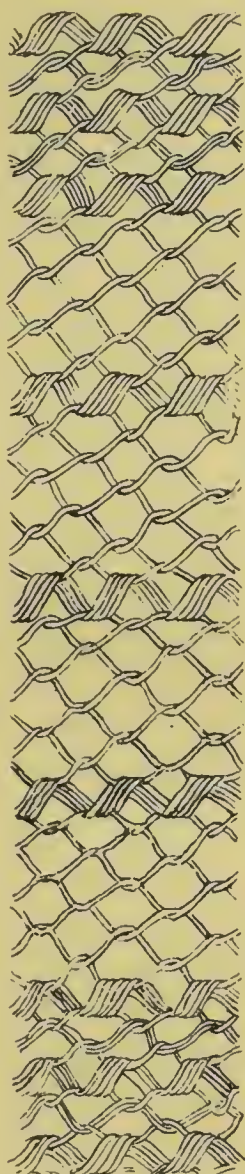
The Warrington Waterworks Company's water service is laid on to all parts of the building, and the drains communicate with the main sewer in Aikin Street, there being no direct communication between them and the interior of any of the hospital buildings. Gas is used throughout the premises.

Disinfecting  
apparatus.

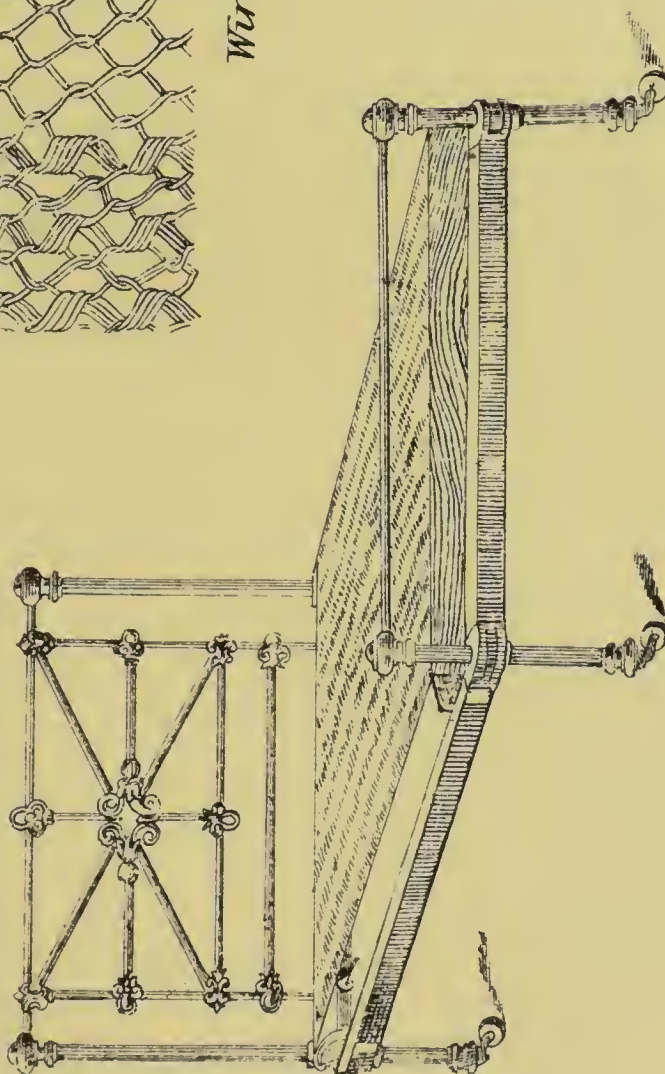
The disinfecting apparatus is a "Ransom stove," as manufactured by Messrs. Goddard and Massey, of Nottingham. It occupies the centre of a building, which is divided by means of a partition wall into two rooms, one for the reception of infected articles, the other to receive the articles which have been passed through the stove. All articles dealt with in this stove are submitted to a temperature of 250° Fahrenheit; and only on one occasion, soon after the stove had been procured, has any article appeared to receive any damage. On that occasion some sheets, which were put in very wet, were seen to be slightly discoloured when taken out; and the hospital care-taker, who has charge of the stove, expresses the belief that they were free from this discolouration when put into the stove. Since then, however, articles numbering many hundreds, and often including delicate materials, such as seal skins, lace, silks, &c., have been regularly stoved



# HOSPITAL BEDSTEAD, WITH MATTRESS COMBINED.



*Wire work forming mattress  
Half Size.*

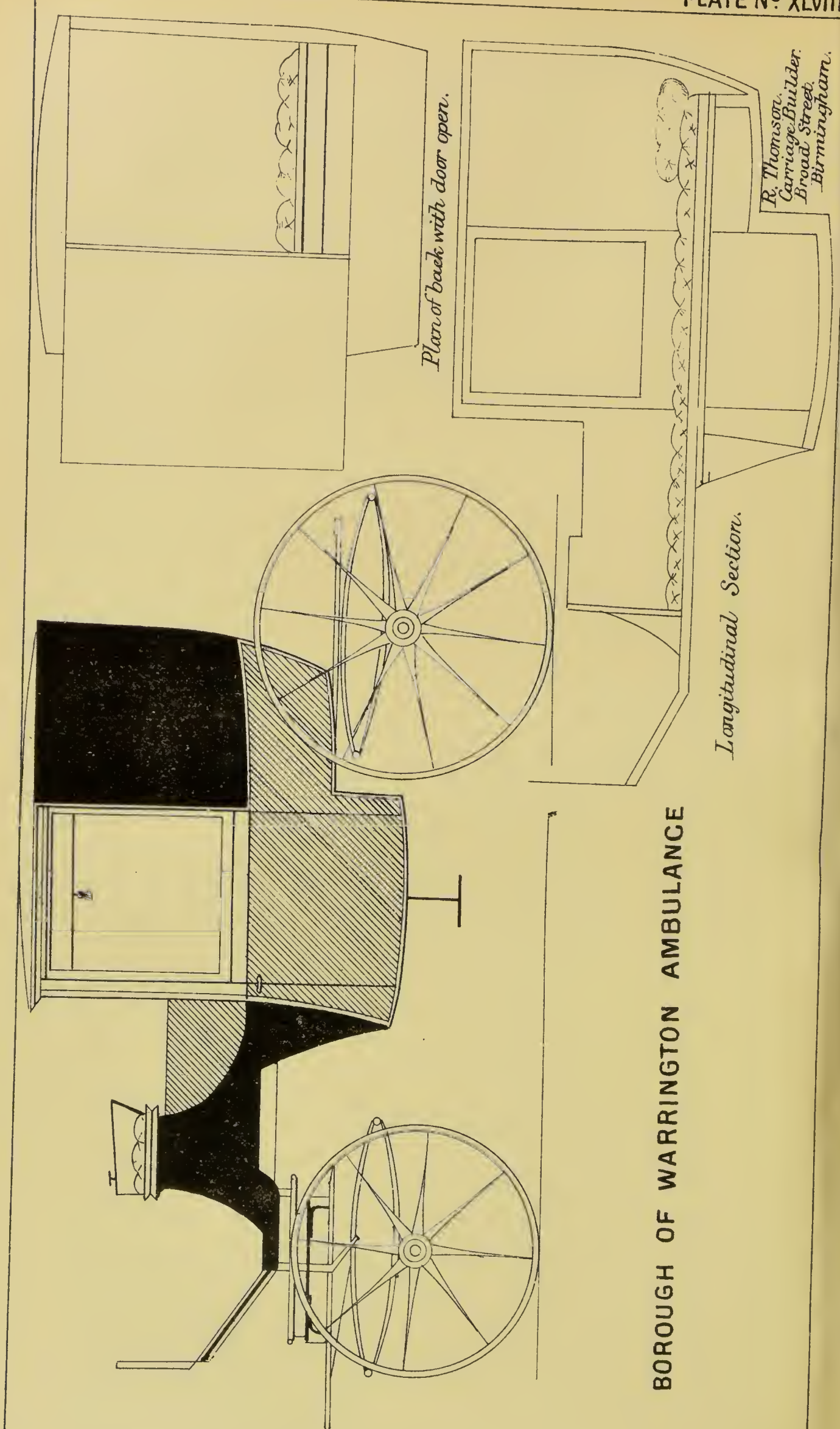


*J. B. Rowcliffe & Co.  
Dinting Wire Works,  
near Glossop.  
Manchester.*









BOROUGH OF WARRINGTON AMBULANCE



without any damage resulting. The stove is, as a rule, filled at night with the articles needing disinfection, and the regulator being set at 250° Fahrenheit, it is left until the morning, when the contents are removed. No list is kept as to the number of articles dealt with, but they are believed to include all in the borough that have needed disinfection within the past two years, in addition to some sent in from adjoining districts. Two hand-vans are kept in connexion with the stove; one labelled "In" is used for bringing infected articles into the hospital premises for disinfection; the other labelled "Out" serves to take them back after disinfection.

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The ambulance, which somewhat resembles a large brougham, has been specially constructed for the purpose. It is throughout lined with wood, and easily admits of being cleaned and "fumigated" after each use. By means of a door at the back a movable stretcher holding the patient can slide in, the patient's feet passing under the box-seat; a second door at the side admits the attendant, or a patient who is able to sit up. The ambulance is also at times used for the removal to the hospital of the patient's bedding and clothing. The ambulance is always in charge of the hospital lodge-keeper, who wears a special dress which is disinfected after each use. This officer, who can be fully trusted, has distinct instructions as to not stopping anywhere on his way to and from the patient's house. If a nurse travels with the patient she wears her hospital uniform. At times a female relative accompanies the patient, but in such a case her outer clothing is stoved before she returns home. (See Plate, No. XLVIII.)

Ambulance.

The mortuary is also fitted up as a post-mortem room.

Mortuary.

Between the opening of the hospital in May 1877, and the end of that year, 7 patients were admitted, 2 suffering from small-pox, and 5 from scarlet fever.

Admission of patients.

The total admissions from the borough of Warrington, together with the deaths registered from the corresponding diseases, during the three years 1878-80 have been as follows:—

				Small-pox.		Scarlet Fever.		"Fever."		Other Diseases.	
				Deaths registered in Borough.	Admissions to Hospital.	Deaths registered in Borough.*	Admissions to Hospital.	Deaths registered in Borough.	Admissions to Hospital.	Deaths registered in Borough.	Admissions to Hospital.
1878	...	...	...	0	2	104	13	9	9	?	1
1879	...	...	...	0	0	40	14	14	22	?	2
1880	...	...	...	0	0	12	54	6	12	?	4
3 years 1878-80	...			0	2	156	81	29	43	?	7

\* Certain deaths of persons received into the hospital from other districts are not included.

Although in several cases out-door paupers, and in two instances in-door paupers, have been admitted, the Corporation do not profess to have provided accommodation for the isolation of cases of infectious diseases occurring among the pauper class.



## APP. No. 1.

On the Use and  
Influence of  
Hospitals for  
Infectious  
Diseases, by  
Dr. Thorne.

Advantages  
of isolation.

Compulsory  
notification of  
infectious  
diseases, &c.

Its influence  
in securing  
isolation.

Writing at the end of 1878, the then Medical Officer of Health, Mr. G. W. Joseph, stated that the prejudice against removal to hospital, which at first existed, was subsiding; and he added, with regard to the influence of isolation, that "in no case where this was carried out was there any spread of infection."

In July 1879 the Warrington Corporation Lighting and Improvement Act 1879, came into operation, and the provisions of this Act are stated to have materially aided the Sanitary Authority in their efforts to stay the spread of infectious diseases. Sections 23, 24, and 25 of this Act are appended to this report, and it will be seen that under these clauses, 1st, information as to the existence of infectious disease is required to be "forthwith" given to the Corporation both by the occupier of the affected house and by any medical practitioner who may be called in; 2nd, the Corporation may in all cases where they deem it necessary, themselves cleanse and disinfect houses and articles; and 3rd, they may, on the certificate of the Medical Officer of Health, or any other legally qualified medical practitioner, to the effect that a patient suffering from any one of certain specified infectious diseases, is "without proper lodging and accommodation, enabling the case to be properly isolated, so as to prevent the spread of the disease, or to be properly treated," require the removal of the patient to the hospital for infectious diseases.

Towards the end of June 1880 two cases of scarlet fever were reported under this Act, one was removed to the hospital, but the other, on account of its tender years, was allowed to remain at home. Three more cases were reported in July. One patient was convalescent when the report was received, but the other two were removed to the hospital. In another case occurring at about the same date no report was made, and legal proceedings were in consequence taken against the defaulters, a fine being imposed.

During the month of August 22 fresh cases were reported at intervals as having occurred in widely distant parts of the borough, and since, as reported by Mr. J. H. Gornall, the present Medical Officer of Health, the disease has "rarely been absent" in Warrington since 1865, the occurrence of a large epidemic was feared unless it could be checked by efficient isolation and disinfection. All but two of these 22 cases were removed to hospital as soon as they were heard of; the notification, however, in some cases was not made at the commencement of the disease. One of the patients who was not taken to hospital, died before isolation could be resorted to, and the other remained at home because the parents insisted that they possessed ample means of isolation in their own house, and that their other children had been removed. During the month of September 7 more cases were reported to the Authority, all the patients being removed to the hospital. In October, notification was received as to 10 cases. Three of these cases occurred in one house, and no medical advice having been sought, they were not heard of until the death of one of the patients. With this exception all cases heard of this month were removed to the hospital.

One of the cases occurring during this month took place in the house where the patient, who sickened in August, was allowed to remain on the ground that isolation could be effectually carried out, without removal to hospital.

Seven additional attacks were reported in November as being "distributed in all portions of the town," and all the patients were removed to the hospital. In the month of December more cases



were reported, 8 being removed to the hospital. Of the remaining three, two died before removal could be effected, and in the third case proceedings were taken under section 25 of the Warrington Corporation Lighting and Improvement Act, 1879, to secure isolation in the hospital. The magistrates, however, considered that the measures of isolation already carried out in the house affected were sufficient, and hence no order for removal was granted. In all, 52 scarlet-fever patients were removed to the hospital for infectious diseases between June and December, the houses from which they were taken being cleansed and "disinfected," and their clothing, bedding, &c. being dealt with in the disinfecting stove.

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On the Use and  
Influence of  
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Infectious  
Diseases, by  
Dr. Thorne.

Twenty-two fresh cases came under notice between January 1st, 1881, and the end of May, when the epidemic as such appeared to have ceased; some of the cases being reported in each of the several five months. One patient, when the notification was received, was found dying, and in another case the disease was concealed, and legal proceedings were taken against the offenders, but all the remaining 20 were isolated in the hospital.

Comparison of this epidemic with some previous ones which have prevailed in Warrington, shows that whereas in 1863, 1869, and 1878, there were respectively 383, 109, and 104 fatal cases from scarlet fever, only 15 occurred between the beginning of June 1880 and the end of May 1881, and it is evident that this diminished mortality has not been due to the fact that many of the residents in the houses affected were protected by previous attacks, for in the 44 houses from which the 52 patients were removed, there were as many as 101 "children"\* who had not before had scarlet fever, and in only one house did a subsequent attack occur.

The epidemic is not believed to have been due, in any considerable degree, to importation, but rather to the recrudescence of infection which hitherto has constantly been present in the borough, and which has from time to time spread with rapidity and led to a large mortality.

Out of a total of 190 patients admitted since the hospital was opened in 1877 as many as 122, or 69 per cent., have been children of 10 years of age and under, the actual ages being as follows:—

Isolation of  
young children.

One year	-	-	-	-	-	3
Two years	-	-	-	-	-	9
Three years	-	-	-	-	-	17
Four years	-	-	-	-	-	22
Five years	-	-	-	-	-	27
Six years	-	-	-	-	-	10
Seven years	-	-	-	-	-	7
Eight years	-	-	-	-	-	12
Nine years	-	-	-	-	-	8
Ten years	-	-	-	-	-	7
						<hr/> 122
Over ten years	-	-	-	-	-	68
						<hr/> 190

\* The ages of these children were not recorded, but nearly all, if not all, were under 12 years.

## APP. NO. 1.

The social status of the patients admitted has been as under:—

On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.	Working classes	-	-	-	-	-	168
	Trades people	-	-	-	-	-	6
	Publicans	-	-	-	-	-	4
	Club manager	-	-	-	-	-	1
	Schoolmaster	-	-	-	-	-	1
	Professional classes	-	-	-	-	-	2
	Bank manager	-	-	-	-	-	1
	Clerks	-	-	-	-	-	3
	Stationmaster	-	-	-	-	-	1
	Merchant	-	-	-	-	-	1
	Reporter	-	-	-	-	-	1
Social status.	Commercial traveller	-	-	-	-	-	1
							190

## Repayments by patients.

From the date of the opening of the hospital until December 1880, a charge of 16s. per week was made for all patients admitted, the Sanitary Committee of the Town Council having, however, discretion to remit the charge, in part or in whole, in any cases where they considered that the patients or their friends were unable to pay. Great difficulties are stated to have been experienced in collecting the amounts due; considerable intervals elapsing before the payments were made, and even then it was often effected by means of very small instalments. In about six instances proceedings were taken by the Sanitary Authority, either under section 132 of the Public Health Act, 1875, or under the Local Act of 1879, to recover payments due for maintenance and medical treatment in hospital from persons really able to pay, and in each case payment was ordered to be made. But at the municipal election held in November 1880, free admission to the hospital for infectious diseases was made an "election cry," and since that date no charge has been made.

## Public Health Act, s. 132.

## General and medical administration.

The general administration of the hospital is in the hands of Mr. J. H. Gornall, who also attends all patients not desiring to be attended at their own cost, by a medical practitioner of their own choice. Of the 190 patients admitted since the hospital was opened, 55 have received private medical attendance. As "medical superintendent" of the hospital Mr. Gornall received up to the end of 1880 an annual fee of 50l., the amount having since then been raised to 100l. He is in this capacity immediately responsible to the Sanitary Committee of the Town Council.

## Influence of hospital on surrounding neighbourhood.

The position of Aikin Street with regard to the hospital has already been referred to. It is a street containing 64 houses, belonging for the most part to the working classes; it forms the only means of access, whether by ambulance or otherwise, to the hospital; two of the houses abut on the hospital premises; and its total population is 708. Joining Aikin Street at right angles, and at distances from the hospital gateway of 300 feet and 425 feet respectively, are two other streets of a similar character, namely, Elizabeth Street and Leicester Street, the former containing 39 houses and a population of 192, the latter 35 houses and a population of 182. Thus, leaving out of question a few other houses within the same area, there are in these three streets, and within 550 feet of the hospital, 138 houses and a population of 1,082 persons, amongst whom are many children.

In view of these circumstances, I made special inquiry as to the prevalence or otherwise of any cases of infectious disease amongst this population, and I ascertained that between July 1879, when the com-



pulsory notification of infectious diseases come into operation, and the date of my visit in January 1881, not a single case of any of the infectious fevers isolated in the hospital had occurred in any one of these streets. Neither had the hospital in any other way been instrumental in causing the spread of infection.

[Since writing the above I have received more recent details on this point from Mr. Gornall. From these it appears that between June 1880 and the end of December 1881, and owing to a subsequent extension of the disease (see Appendix D., page 296), as many as 424 cases of scarlet-fever were notified as having occurred throughout the borough. During the same period 4 cases occurred amongst the population inhabiting the three streets near the hospital. The rate of attack to population for the borough generally was 10·2 per 1,000; that for the area around the hospital was only 3·6 per 1,000. But one of the four attacks in the special area occurred in a child who had only just arrived in the town, having distinct symptoms of scarlet-fever before reaching Warrington; thus reducing the number of attacks in that area to 3, and the rate of attack to population to 2·8 per 1,000. And further, one of the 3 remaining cases occurred in a child whose mother, besides paying frequent visits to a house where a concealed case of scarlet-fever in a child was prevailing, had actually brought away with her some of the clothing worn by the patient visited; and the remaining case was that of a girl who had opportunity of contracting the disease at school. The total admissions from scarlet-fever into the hospital during the 19 months June 1880-December 1881 were 282. For six months of this period, and by the aid of hospital tents, &c., the admissions had varied from 20 to 60. During 4 consecutive months they amounted to 36, 60, 57, and 49 respectively. Three of the four attacks notified from the special area about the hospital occurred when the wards were comparatively empty.]

Arrangement has been made by the Warrington Corporation on the one hand, and the Warrington rural and Lymm urban sanitary authorities on the other hand, for the admission into the borough hospital of patients from the districts of the two latter authorities, the arrangement being subject to a three months' notice by either party, and to there being accommodation available at the time, in excess of the immediate requirements of the borough. The payment made by the authorities in question consists of an annual sum, and of a weekly sum per patient. In estimating the annual sum to be paid by the Rural Sanitary Authority it was calculated that the cost incurred in maintaining the hospital when empty, including its permanent establishment charges, together with interest on the original outlay, amounted to 13*l.* for every 1,000 of the population of the Warrington Union, and after excluding the populations of the three urban districts in the union, viz., Warrington, Newton-in-Makerfield, and Haydock, that of the rural district was ascertained to be about 10,000, and the annual payment was fixed at 130*l.* The cost for the maintenance and medical treatment of patients was also fixed at 16*s.* per week per patient. The Lymm Urban District is not within the Warrington Union, but the annual payment is calculated much on the same basis. The district has an estimated population of 4,700, and makes an annual payment of 50*l.*, together with 16*s.* per week per patient sent in.

Although occasional patients were admitted from the Warrington rural sanitary district in 1878, the arrangement referred to has only been in existence since March 25th, 1879. During 1879 the deaths registered in that district included 12 from scarlet-fever, 3 from diphtheria, and two from fever. Six patients were admitted, all suffering from scarlet-fever. In 1880 the deaths included three from scarlet-fever, and four from "fever," and the admissions were 14. Of these, nine were suffering

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Arrangement  
with the  
Warrington  
Rural and  
Lymm Urban  
Authorities.

Warrington  
Rural District.

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Lymm Urban  
District.

from scarlet-fever, and four from "fever." The hospital, it should be stated, lies to the extreme south of the rural district, at distances varying from one to seven miles from its most populous localities.

The arrangement with the Lymm urban district came into operation in March 1878. The district has an estimated population of 4,700, and is 6 miles from Warrington. In 1878 and 1879 there was but little infectious disease in the district and no cases appear to have been sent in to the hospital, but the disinfecting stove is reported by the Medical Officer of Health to have been "of service." In the first and second quarters of 1880 scarlet-fever became prevalent in the district, and out of "about 40 cases" which were heard of, and all of which occurred among the working classes, nine were sent to the hospital at Warrington. In all, 16 deaths from scarlet-fever were registered in Lymm during 1880, in addition to two fatal attacks amongst those removed to the Warrington Hospital. In his report on the Lymm urban district for 1880 Dr. J. M. Fox, the Medical Officer of Health, says, "A prejudice against the use of "the hospital arose on account of its distance which was the occasion "also of additional cost and danger."

The total admissions into the Warrington Hospital from all sources, during the three years 1878-80, have been as under:—

—	Small-pox.	Scarlet Fever.	"Fever."	Other Diseases.
1878 .. .. .	8	23	14	1
1879 ... .. .	0	19	22	2
1880 ... .. .	0	72	18	4
1878-80 ... .. .	8	114	54	7

Cost of con-  
struction.

The following is a summary of the total expenditure incurred by the Sanitary Authority in the construction and furnishing of the hospital, together with the provision of the disinfecting stove and ambulance:—

	£	s.	d.
Purchase of land for site - - -	300	0	0
Release of right in Aiken Street - - -	50	0	0
Erection of first portion of hospital - - -	2,182	5	1
Erection of second portion of hospital - - -	3,320	10	0
Hot water apparatus - - -	79	18	0
Entrance gates, &c. - - -	95	0	0
Kitchen ranges, gates, chimney-pieces, &c. - - -	120	5	9
Gas fittings - - -	80	18	0
Water fittings - - -	27	8	6
Furniture, bedding, &c. - - -	105	9	7
in " 1879-80 " plumbing, painting, &c., - - -	355	3	3
	£6,716	18	2
Disinfecting stove - - -	125	0	0
Ambulance - - -	74	0	0
	£6,915	18	2



The total cost of maintenance, and the receipts during the year ending March 29, 1880, with the exception of certain items for additional furniture, &c., which are included in the above account relating to cost of construction, were as follows:—

RECEIPTS.			EXPENDITURE.			Cost of main-tenance.
	£	s. d.		£	s. d.	
Lymm Urban Sanitary Authority, 1 year .. .. .	50	0 0	Medical officer .. .. .	50	0 6	
Warrington Rural Sanitary Authority, 9 months .. .. .	97	10 0	Salaries to nurses, servants, &c. ..	160	14 7	
Medical aid and maintenance:—			Provisions .. .. .	124	18 0	
By Warrington Rural Sanitary Authority ..	28	10 10	Medicine, wine, &c. .. ..	29	10 8	
By private individuals ..	32	16 5	Sundry establishment expenses ..	14	8 0	
			Coals, gas, water, and taxes ..	113	17 10	
Disinfecting bedding and clothing ..		61 7 3				
Miscellaneous .. .. .		7 8 10				
		1 0 0				
	£217	6 1		£483	9 7	

WARRINGTON CORPORATION LIGHTING AND IMPROVEMENT ACT, 1879,  
SECTIONS 23, 24, AND 25.

*Infectious Diseases.*

23. In order to secure that due notice be given to the Corporation of any inmate of any building used for human habitation who is suffering from small-pox, cholera, scarlatina, diphtheria, typhus fever, enteric or typhoid fever, relapsing fever or puerperal fever, the following provisions shall have effect (that is to say):—

Notice to be given of persons suffering from infectious diseases.

- (1.) If any such inmate be suffering from any such disease as aforesaid, the occupier or person having the control or charge of such building shall, so soon as he shall become aware of the existence in any such inmate of any such disease, forthwith give notice to the Corporation at the town hall of the existence in such inmate of such disease; and if such inmate be not a member of the family of such occupier or person, the head of the family (resident in such building) to which such inmate belongs, or if there be no such head, then such inmate (unless prevented by reason of such disease or of youth) shall, on becoming aware of the existence in such inmate or in his own person as the case may be of such disease, forthwith give notice thereof to such occupier or person:
- (2.) The Corporation shall provide and supply gratuitously to every legally qualified medical practitioner resident or practising in the borough, forms for the certificate or declaration by such medical practitioner of the particulars herein-after mentioned in relation to such cases, in the form set forth in the Third Schedule to this Act, or to the like effect:
- (3.) Every medical practitioner attending on or called in to visit such inmate shall, on becoming aware that such inmate is suffering from any such disease as aforesaid, *forthwith* fill up, sign, and send to the Corporation at the town hall, a certificate or declaration, stating, according to the form supplied by the Corporation, the name of such inmate, the situation of such building, and the name of such occupier or person, and the nature of the disease from which such inmate is suffering.
- (4.) The Corporation shall pay to every medical practitioner who shall, in pursuance of this section, duly make and give any such certificate or declaration, a fee of two shillings and sixpence for each such certificate or declaration:
- (5.) The Corporation may from time to time (with the sanction of the Local Government Board) by order declare that this section shall apply temporarily or permanently in the case of any contagious or infectious disease specified in such order, and this section shall apply accordingly: Provided, that every such order shall be published by the Corporation in such manner as they think best adapted to bring it to the knowledge of the inhabitants of the borough.

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Further  
powers in  
relation to  
disinfection of  
premises.

Further  
powers for  
removal to  
hospital of  
infected  
person.

Any person who offends against any of the foregoing enactments (unless ignorant thereof, the burden of the proof of which shall be on him,) shall be liable to a penalty not exceeding five pounds, and for a second or any subsequent offence to a penalty not exceeding ten pounds.

21. Where the Corporation are of opinion on the certificate of their medical officer of health, or of any other legally qualified medical practitioner, that the cleansing and disinfecting of any house or part thereof, and of any articles therein likely to retain infection, would tend to prevent or check infectious disease, and that such cleansing and disinfecting would more effectually be carried out by the Corporation than by the owner or occupier of such house or part thereof, the Corporation may, without requiring such owner or occupier to carry out such cleansing and disinfection as aforesaid, themselves cleanse and disinfect such house or part thereof and articles, and may for that purpose remove any such articles, and may recover the expenses incurred by them in the execution of this section from such owner or occupier, or may, if they see fit, themselves defray such expenses, or any part thereof.

25. Whereas the Corporation have provided within the borough a suitable hospital for the reception, treatment, and isolation of persons suffering from dangerous infectious diseases, and it is expedient to make further provisions for removal thereto of persons so suffering: Be it enacted, that on the certificate of the medical officer of health of the borough or other legally qualified medical practitioner, that any person within the borough is suffering from small-pox, cholera, scarlatina, diphtheria, typhus fever, enteric or typhoid fever, relapsing fever, puerperal fever, or any other dangerous infectious disease, and is without proper lodging or accommodation enabling the case to be properly isolated so as to prevent the spread of the disease or to be properly treated, the Corporation may give notice to the head of the family, (resident in the same building) to which the person so suffering belongs, requiring the removal forthwith of such person to such hospital as aforesaid: Provided that if there is no such head of the family, or if such head of the family is absent from the borough or cannot be found, such notice may be given to the person so suffering.

If the person to whom such notice is given consents, the Corporation may forthwith remove the person so suffering to such hospital as aforesaid; but if the person to whom such notice is given refuses to consent to such removal or to be removed, or is by reason of age, disease, or otherwise, incapable of giving such consent, any justice may, on the application of the Corporation, make an order for the removal of the person so suffering to such hospital as aforesaid. Such order may be addressed to an officer of the Corporation or to any constable of the borough, and any person who disobeys or obstructs the execution of such order shall be liable to penalty not exceeding ten pounds, and to a further penalty not exceeding twenty shillings for every day during which such disobedience or obstruction continues.

Any expenses incurred by the Corporation in respect of the conveyance of such person to such hospital, and his maintenance and treatment therein, may be recovered by the Corporation from such person, or from his personal representatives in the event of his death therein; or the Corporation may, if they see fit, themselves defray such expenses or any part thereof.

## WEYMOUTH PORT SANITARY DISTRICT.

The Port Sanitary District of Weymouth consists of so much of the Port of Weymouth as abuts on the several parishes of Radipole, Melcombe Regis, Weymouth, Wyke Regis, and Portland, and the Port Sanitary Authority consists of five members of the Urban Sanitary Authority of Weymouth and Melcombe Regis, three of the Urban Sanitary Authority of Portland, and two of the Rural Sanitary Authority of the Weymouth Union.

The hospital for infectious diseases, which had been provided by the Port Sanitary Authority, was only completed in December 1880, and although during its construction the necessity for means of isolation was shown by the importation into the port, on two occasions, of cases of

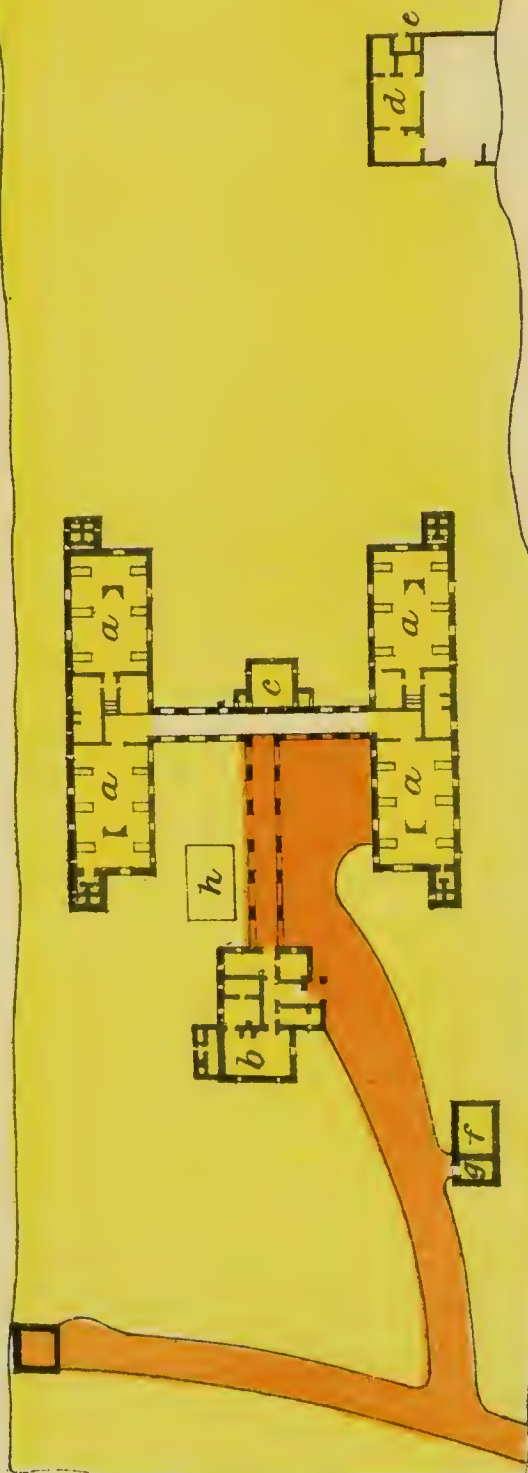




WEYMOUTH PORT SANITARY HOSPITAL.  
*For Infectious Diseases.*



- a. a Wards
- b. Administrative building
- c. Isolationary Ward
- d. Laundry
- e. Disinfecting Stove
- f. Mortuary
- g. Ambulance Shed
- h. Rainwater Tank.



BLOCK PLAN.

*Crickmay & Son  
Architects  
17, Parliament St. S. W.*

*Scale 80 feet to one Inch.*





WEYMOUTH PORT SANITARY DISTRICT. HOSPITAL FOR INFECTIOUS DISEASES.

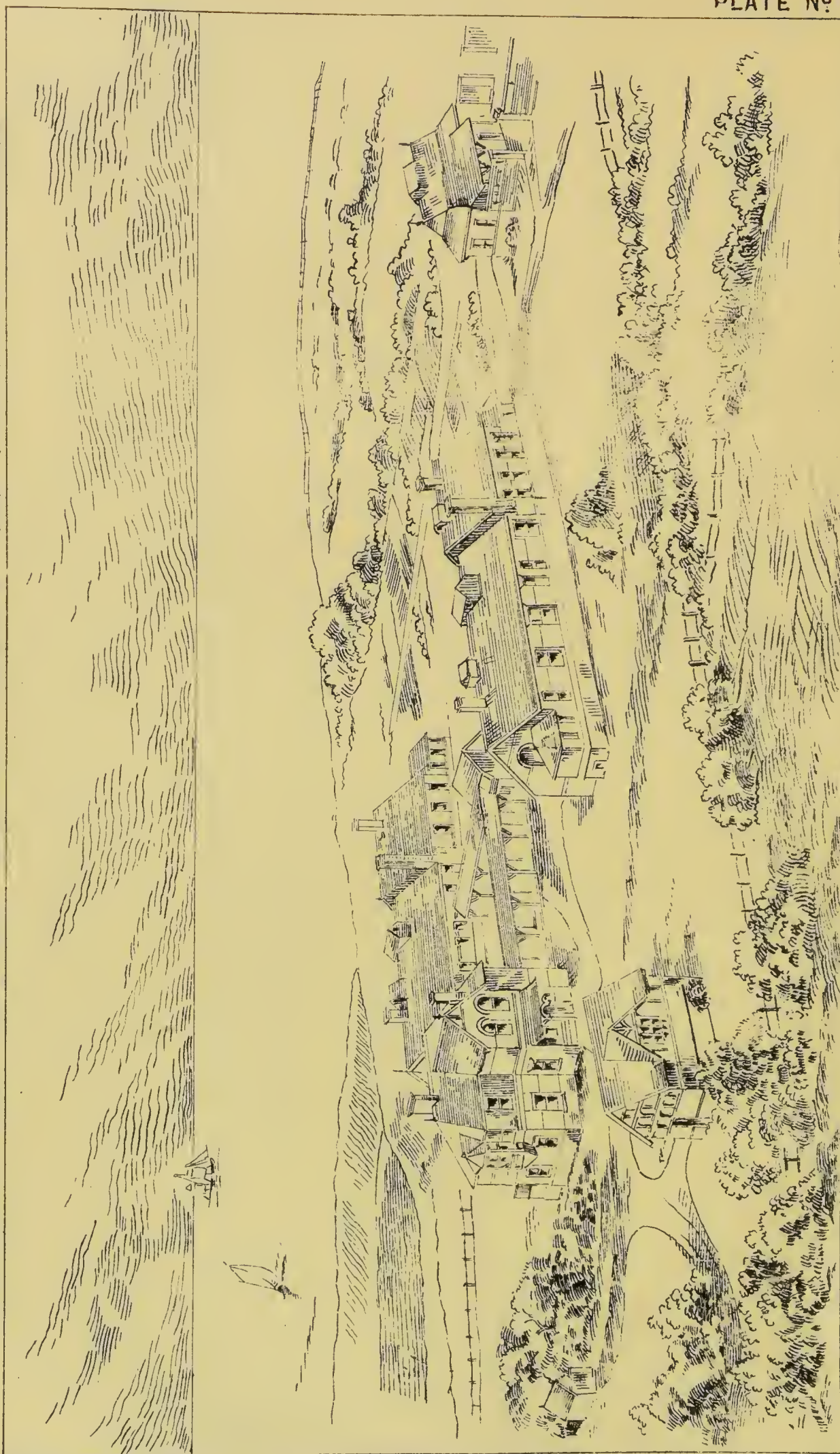


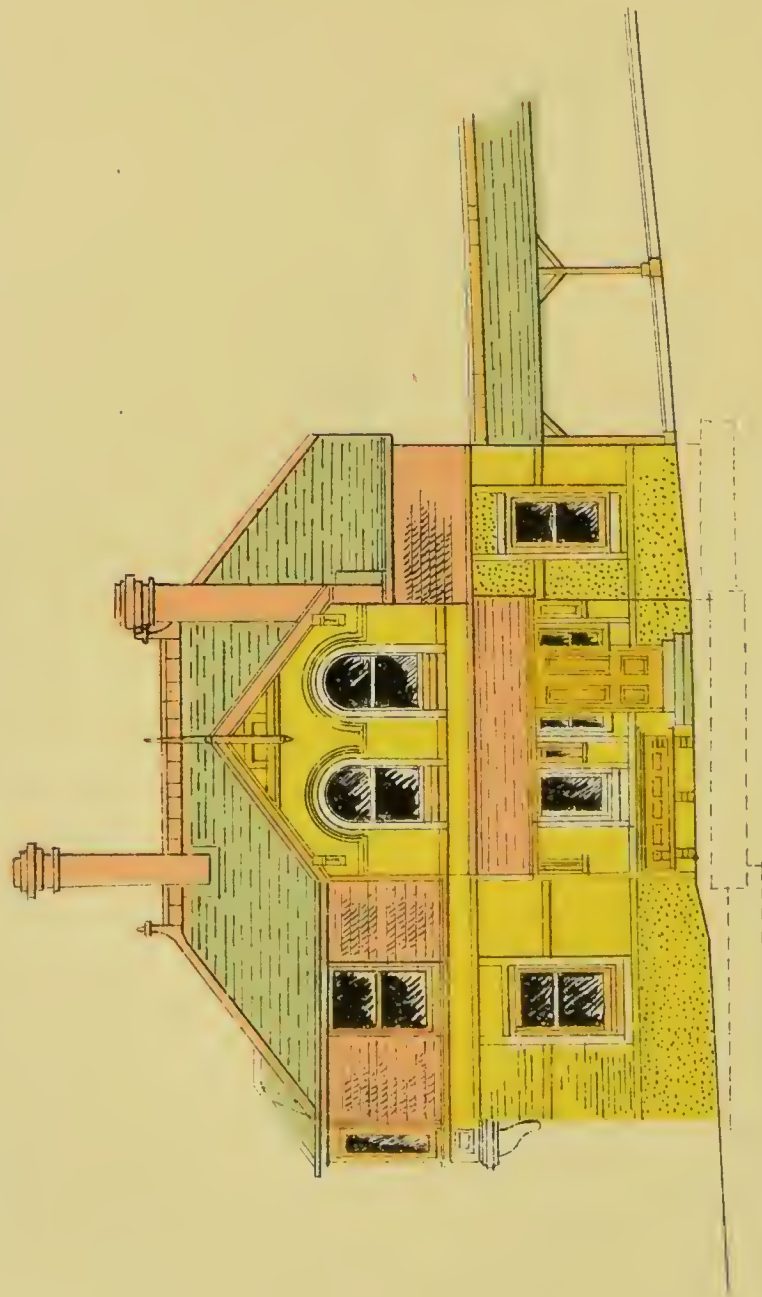
PLATE Nº L.

*Crickmay & Son.  
Architects.*



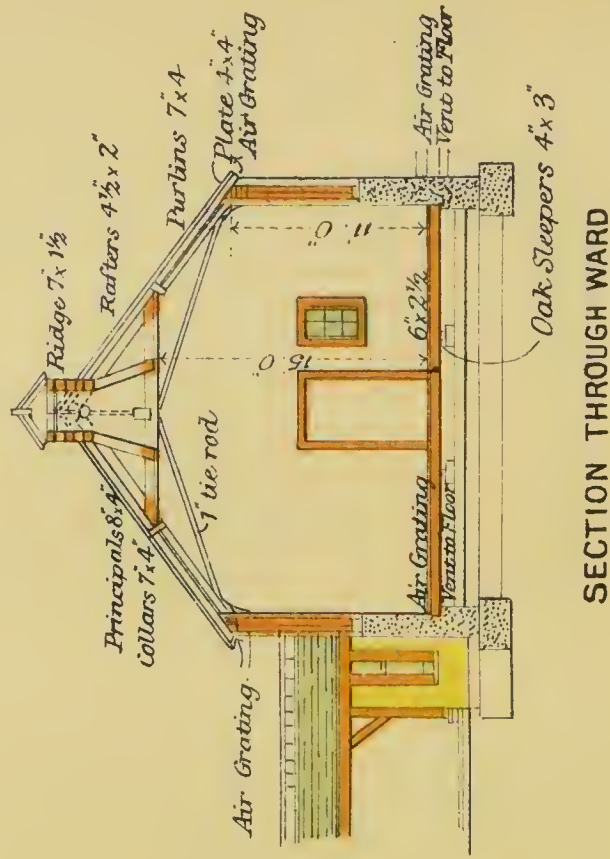


# WEYMOUTH PORT SANITARY HOSPITAL. For Infectious Diseases.



FRONT ELEVATION OF ADMINISTRATIVE BUILDING.

Scale, 16 Feet to one Inch.



Crickmay & Son  
Architects  
17, Parliament Street, S.W.



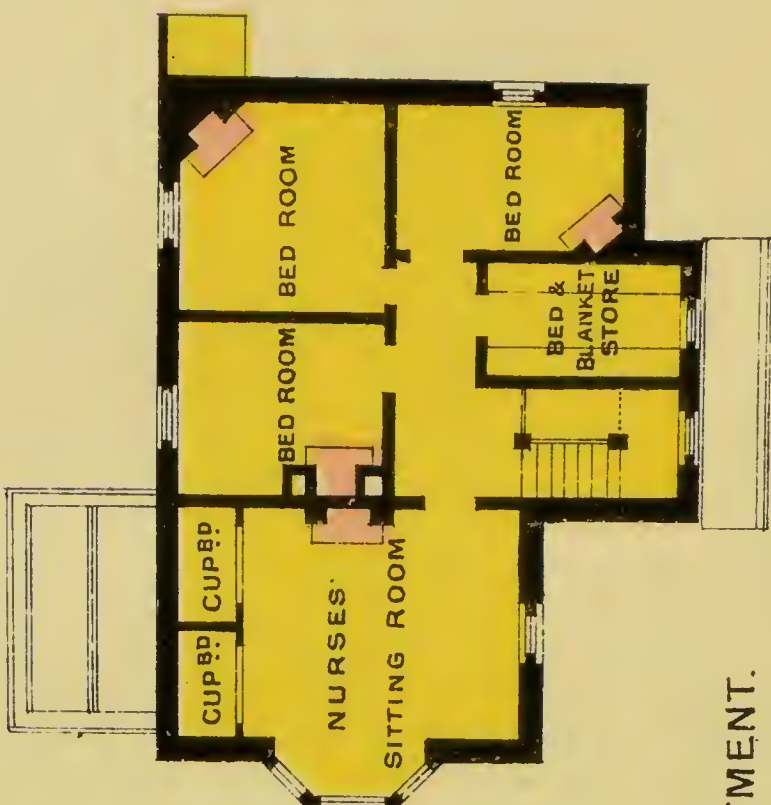


WEYMOUTH PORT SANITARY HOSPITAL.

*For Infectious Diseases.*



GROUND PLAN.



FIRST FLOOR PLAN.

ADMINISTRATIVE DEPARTMENT.

*Scale 1/16 feet to one Inch.*

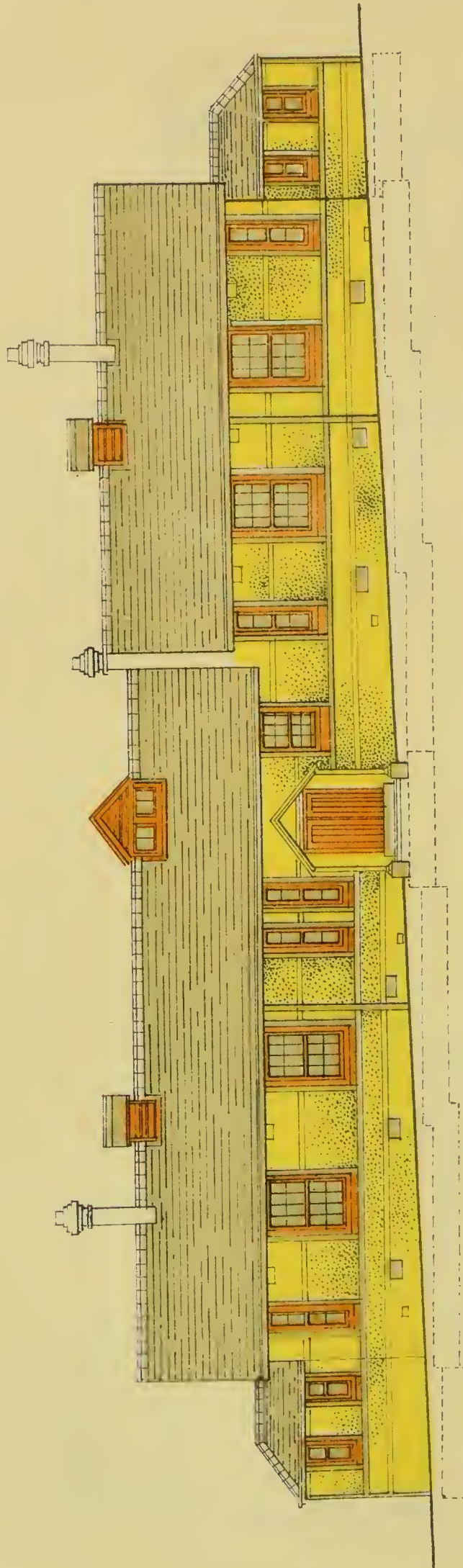
*Gickmay & Son Architects  
17, Parliament St. S.W.*





# WEYMOUTH PORT SANITARY HOSPITAL.

*For Infectious Diseases*



ELEVATION OF A WARD PAVILION

*Scale; 16 feet to one Inch.*

*Crickmay & Son  
Architects.  
17 Parliament St. S.W.*





# WEYMOUTH PORT SANITARY HOSPITAL

*For Infectious Diseases.*



PLAN OF A WARD PAVILION.

*Scale 16 feet to one Inch.*

*Crickmay & Son.  
Architects  
17, Parliament St. S.W.*



infectious diseases which had to be isolated elsewhere, no case had been admitted into it at the date of my inspection early in 1881.

The hospital lies about midway between Weymouth and the Isle of Portland, on a sloping site close to the sea and the narrow neck of sand which connects the Isle of Portland with the main land. The views obtained from it are on nearly all sides picturesque. To the north is the parish of Wyke Regis, on the border of which it is situated; to the south lie the Portland Roads and the Isle of Portland; to the east is Weymouth Bay, and to the west are the West Bay and the Chesil Beach. The site is about 700 feet long and 160 feet wide; in all rather over  $2\frac{1}{2}$  acres; and it is as yet only enclosed by hedges and an open fence. The soil is shingle overlying Kimmeridge Clay.

The hospital buildings consist of, 1° an administrative block, 2° two ward-pavilions communicating with the administrative block and with each other by means of covered ways open at both sides, 3° a detached probationary or "isolation" ward lying midway between the two pavilions and also opening on to the covered way, and 4° two sets of outbuildings, one containing an ambulance shed and a mortuary; the other a wash-house, ironing-room, and a room intended to contain a disinfecting stove. They have been constructed from the designs of Messrs. Crikmay and Son, of 17, Parliament Street, S.W., under whose supervision the works have been carried out. (See Plates, Nos. XLIX. to LIV.)

The administrative block has its foundations laid in cement concrete made of five parts of broken portland stone, one part of clean pit sand, and one part of cement; and the ground surface of the site on which it stands is also covered with a six-inch layer of the same material. It is a two storied building of a decidedly attractive appearance. All the walls of this building, as also those of the ward pavilions and outbuildings, are formed of portland cement concrete; the external walls being 14 inches and the internal ones 6 inches thick. All the elevations facing the road have portland cement dressings round the window openings, and bands of red tile and portland cement; the wall spaces between the bands and dressings being finished with clean shingle rough cast. A large portion of the upper floor is tile hung, and the principal room, which faces south, has an oriel window, beneath which are panels filled in with red tiles. The window-eills throughout are formed of red tiles bedded in cement. The porch is of ornamental wood-work supported on brackets and covered with tiling. The chimneys are of red brick and the roof of slate. On the ground floor are an entrance hall, a room for the medical officer, a kitchen, scullery, larder, coal and other stores, and in a yard outside an earth closet and ash-bin; the floors being separated from the concrete foundations and bedding by means of a well-ventilated air space. On the first floor is the care-taker's bedroom, a large sitting-room and two bedrooms for nurses, together with a store-room for bedding, blankets, &c. The windows throughout consist of double-hung sashes; the tops being close to the ceiling.

The two Ward Pavilions are alike; they consist of one floor only, and with the exception that they are in no part tile-hung, they are, as regards their foundations and external construction, very similar to the administrative block. In the centre of each pavilion is an entrance hall, a nurse's room, a bath room containing a movable bath, a store-room and a coal cupboard. The entrance hall is surrounded by a large shaft measuring 10 feet by 7 feet across, fitted with glass, and having a pointed roof above, which is louvred at the sides. Near this shaft is a large rain-water tank. The nurse's room is provided with fixed windows commanding a view of the wards which lie on either side of it, and it is fitted with a small kitchen range and a sink; the range being provided

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Site and soil

Hospital buildings.



with a back boiler and circulating pipes to convey hot water to the sink and bath-room. Both the wards in each pavilion are 36 feet long and 24 feet wide; in height they are 11 feet to the wall plate, and 15 feet to flat ceiling at the collar of the roof. They each contain six beds, or at the rate of 144 square feet, and 2,014 cubic feet per bed. There are four double-hung sash windows in each of the opposite side walls, those at either end being narrower than the central ones and coming close up to the corners. All these windows reach to the wall plate, and the sash frames are constructed with a deep bottom rail so that the sash may be opened to allow of the entrance of air between the meeting rails, whilst the window remains closed above and below. There are no architraves round the windows, the reveals of which are finished in parian cement, and there is throughout an absence of any cornices or other architectural projections on which dust could accumulate. At the outer end of each ward is a large circular-headed window carried up, for the purposes of ventilation, to a higher level than the flat ceiling which at this point shelves upwards. The total window area in each ward amounts to 183 square feet, or at the rate of one square foot to every 66 cubic feet. In the centre of each ward is a ventilating shaft, opening by means of louvres above the roof; some 3 inches above the floor, and beneath each bed are also gratings which communicate with the outer air, and which are fitted inside with sliding doors; and 8 inches below the wall plate there is above each bed a similar opening which cannot be closed. The walls are throughout of parian cement trowelled to a hard porcelain liked and impervious surface, and the floors are of well-laid deal tongued and grooved, the tongues being of galvanised iron. A large open fireplace fitted in a chimney-shaft lies in the central line of each ward. An air space behind the fireplace receives fresh air from without, and admits of the passage of a current of warm air into the ward. A separate flue near the ceiling level is arranged to carry off the heated ward air. The fireplaces are, both in the wards and throughout the hospital buildings, lined with tiles and fitted with chimney-pieces of portland stone.

At the outer head of each ward are an earth-closet and a sink, both being well ventilated by a cross-current of air, and being separated from the ward by a lobby having double-hung sash windows in each opposite side walls.

The Isolation Ward consists of a building containing a single room which opens immediately on to the covered way, and the details of its construction, in all essential points, resemble those described as regards the pavilions. It measures 13 feet by 13 feet, and is 12 feet high, thus giving 169 feet of floor space, and 2,028 cubic feet. On either side of it is an earth-closet which is approached from without, one being for the ward itself, the other for the staff.

The covered way between the administrative block and the several wards is of wood covered with a slate roof having a red tile ridge, and being supported on oak posts resting on portland stone bases. The floor is paved with portland cement.

Drainage and  
water-supply.

The slop-drainage is carried into the sea below low-water mark; there being no direct communication between the drains and the interior of any of the buildings. The principal water supply is, as yet, from a large rain-water tank sunk in the grounds and filled by means of down-fall pipes leading from the extensive roof area. Fresh water is carted in a special water cart from the nearest mains of the Weymouth water-works. Should it be found desirable, sea-water could also be laid on to the premises for the purposes of baths, &c.

Administra-  
tion.

The general administration of the hospital is vested in Mr. R. P. Simpson, the port medical officer of health; a care-taker and his wife residing on the premises and receiving 30*l.* a year.]



The expenses incurred in erecting this hospital, together with that involved in the purchase of the site, were as under:—						APP. NO. 1.
		£	s.	d.		On the Use and Influence of Hospitals for Infectious Diseases, by Dr. Thorne.
Purchase of site, with legal expenses	-	334	8	0		Cost of construction
Expenses attendant on loan	-	26	3	0		
Roads and fencing	-	522	3	0		
Buildings	-	4,135	17	0		
Clerk of works	-	133	10	0		
Architect	-	232	0	0		
Fittings	-	10	2	8		
Legal Expenses	-	75	18	9		
Total		£5,470	2	5		

WHITEHAVEN URBAN SANITARY DISTRICT.

Population in 1881, 19,321. Rateable value (1880), 54,647*l.* 14*s.* 6*d.*

In 1866, and in view of the possibility of cholera being imported into Whitehaven, the Harbour Trustees built a substantial stone cottage and a separate ward, on an elevated and isolated site outside the town for the isolation of any persons who might be brought into port suffering from that disease. The cottage is of one story only. It contains a kitchen and scullery, a nurse's bedroom, and two rooms for patients, each of the latter rooms having a superficial area of 143 square feet, and a height of 9 feet, giving 1,290 cubic feet. The ward adjoins the cottage, and has walls partly constructed of stone, partly of wood, with a roof of wood covered with tarred felt. This ward is of irregular shape; it has a floor-space of about 712 square feet, and a cubic capacity of about 9,630 feet. One end of the large ward admits of cross-ventilation by means of the windows, some pivot-hung and some with double sashes. The small rooms used as wards in the cottage have sash windows. All the wards are heated by open fire-places. The nurse's room has a single window opening into the large ward. In a small yard behind, measuring about 16 feet by 10 feet, is a wash-house and a midden-privy, the midden being open to rainfall. There is no recreation ground. Water is carted to the building from the Whitehaven mains, which are supplied from Emmersdale Lake. The drainage is admittedly very unsatisfactory.

When I visited the hospital there were no patients in it, but so far as beds were concerned it was very much overcrowded. One of the small wards in the cottage contained two beds; and the large ward had as many as 17 beds in it, the floor and cubic space per bed being as low as 42 square feet and 507 cubic feet respectively.

Up to 1872 this hospital was never used, but in that year the town trustees acting as Urban Sanitary Authority under a private Improvement Act, and being the same body as the Harbour Trustees, spent a sum of 94*l.* in improving the buildings, and 81*l.* in fittings and furniture, and used it for the purposes of isolating cases of small-pox. Since that date it has not again been used by the Sanitary Authority, although they pay a resident nurse 6*s.* a week, and provide her with fuel and lights. But early in 1880 the Guardians of the Whitehaven Union, with the consent of the Urban Authority, sent in four paupers from the town of Whitehaven, who were suffering from typhus, the Guardians agreeing to pay 14*s.* a week for the maintenance of each patient, and to provide medical attendance.

A proposal has also recently been submitted to the Urban Sanitary Authority by the town surveyor, suggesting a number of improvements

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Infectious  
wing at  
Whitehaven  
and West  
Cumberland  
Infirmmary.

in the hospital, including an alteration of its means of drainage and its closet accommodation, with a view to its being utilised.

During recent years the current expenses incurred in connection with the hospital, including nurse's wages, fuel, candles, repairs, and an annual rental of 9*l.* for the site, has averaged about 29*l.* a year.

In addition, however, to this hospital, there is a special wing for infectious diseases in connection with the Whitehaven and West Cumberland Infirmmary, which is situated within the town. This wing, though a part of the general building, has no direct communication with it, having an entirely separate entrance. The accommodation it contains consists of two wards situated on separate floors, and both having a separate nurse's room, watercloset, and storeroom. The wards are at one end provided with means of cross-ventilation by means of windows in opposite walls, and they are well lighted and warmed. Each ward is 36 feet in length, 24 feet in width, and 15 feet in height, and contains 10 beds, thus giving 84 square feet and 1,296 cubic feet per bed. From information I have received from the secretary to the infirmmary, I learn that during the past three years 99 patients have been admitted into the infectious wards, of whom 88 were resident in Whitehaven, and 11 beyond the limits of the town. The majority of the patients have been sent in by the Guardians of the Whitehaven Union, four only, namely one in 1878 and three in 1879, being admitted on behalf of the Urban Sanitary Authority. Two cases of typhus were under treatment at the date of my visit.

Admission of  
patients.

The total cases admitted from the Whitehaven Urban District, together with the diseases from which they suffered, and the deaths from the same causes in that district are shown in the following Table:—

Date.	Typhus Fever.		Enteric Fever.		Scarlet Fever.*	
	Total Deaths in the Urban District.	Cases admitted into the Infirmmary.	Total Deaths in the Urban District.	Cases admitted into the Infirmmary.	Total Deaths in the Urban District.	Cases admitted into the Infirmmary.
1877 ... ..	8	32	3	—	2	—
1878 ... ..	20	35	4	3	—	—
1879 ... ..	5	15	2	3	5	—
1877-79 ... ..	33	82	9	6	7	—

\* Scarlet fever has hitherto not been received into the Infirmmary.

WIGAN URBAN SANITARY DISTRICT.

Population in 1881, 48,196. Rateable value (1880), 139,000*l.*

Epidemic of  
small-pox  
leading to  
provision of  
hospital.

In 1872, the Urban Sanitary Authority of Wigan took on lease for 14 years, and for the purposes of a hospital for infectious diseases, an old villa residence, the immediate object of this step being an outbreak of small-pox. The hospital is stated to have been most useful during that epidemic in staying the spread of infection; but notwithstanding this, it was closed on the termination of the outbreak, and was only re-opened in 1874, on the advice of one of the Board's Medical Inspectors, who was at that time in the district.

Hospital  
site and  
buildings.

The hospital stands within the borough, on a large open space, partly covered with pit refuse, partly overgrown with grass. The piece of land belonging to it is about 140 feet in length and 80 feet broad. It is en-



closed on one side, and in part on a second side, by a brick wall in which are two entrance gates, one leading to the hospital itself, the other into a stable yard. Elsewhere it is surrounded by a rudely constructed wooden fence, which is dilapidated, and has one large gap in it, some 10 feet in length. Part of the land is laid out as a vegetable garden. The principal building has a basement containing cellars, above which are two stories. On the ground-floor are a kitchen, a sitting-room, and a bed-room, the latter rooms being reserved for the caretaker and his wife. The upper floor contains three rooms. Each has a double-hung sash window and an open fire-place. One contains 1,900 cubic feet and two beds; the second, 970 cubic feet and one bed, the third 900 cubic feet and one bed. Earth-closets are used inside and outside the building. A constant service of water is laid on from the town mains, and the drainage is into the public sewer, none of the drain inlets being within the building.

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The cases admitted since the hospital was re-opened in 1874 are shown in the accompanying table, which also gives the total deaths registered in the borough from the diseases specified.

Admission patients.

Diseases.	1875.		1876.		1877.		1878.		1879.	
	Deaths in Borough.	Cases admitted into Hospital.	Deaths in Borough.	Cases admitted into Hospital.	Deaths in Borough.	Cases admitted into Hospital.	Deaths in Borough.	Cases admitted into Hospital.	Deaths in Borough.	Cases admitted into Hospital.
Small-pox ... ..	6	—	—	1	1	1	—	—	—	—
Scarlet fever ... ..	15	—	1	—	118	6	28	—	81	12
Diphtheria and non-spasmodic croup.	11	—	13	—	28	—	11	—	13	—
"Fever" ... ..	43	2	31	1	29	1	26	4	8	1
Other diseases ... ..	?	—	?	2	?	—	?	—	?	1

In both cases of small-pox admitted, isolation is alleged to have prevented any further spread of the disease, and although a similar opinion is maintained by Mr. W. C. Barnish, the Medical Officer of Health, with regard to the use of the hospital for other diseases, yet the number of such cases admitted when compared with the total number needing isolation, is so small, and the sources of infection to which the families of the few isolated patients were exposed after the removal of the sick, were so many, that the materials on which to found any inference as to the use of the building in preventing the dissemination of infection are necessarily most imperfect. Thus, in 1879, 81 deaths were registered from scarlet fever alone, and although this probably represents not less than some 800 attacks, only 12 cases were admitted. There were 50 deaths from the same cause in the first half of 1880, but only one case was received into hospital. To some extent the limited use to which the hospital has been put is doubtless due to the particularly unattractive exterior of the premises, but it is also alleged to have been largely caused by the circumstance that the officers of the Sanitary Authority have, as a general rule, no information as to the existence of infectious disease until it has spread beyond control in the houses affected. Parents also have often expressed a strong objection to part with the sick, who, in the case of scarlet fever, are so often young children, and it has never been proposed that, under those circumstances, a mother should have the option of accompanying her child. Nine, however, of the twelve scarlet-fever cases admitted in 1879 were children varying in age from 3 years to 11 years.

Value of isolation.

Imperfect use of hospital.

Admission of young children.





The Sanitary Authority have no ambulance of their own, and hence they frequently borrow one belonging to the guardians. The approach to the hospital has for some time past been out of repair, and the ambulance cannot be driven into the hospital premises; hence the patient has to be removed from it in the roadway, at times to the danger of a number of inquisitive people. The conveyance has also to return to the workhouse without being previously disinfected.

The mortuary is intended, not only for the purposes of the hospital, but for those of the town generally. It has been constructed about two years, but the difficulty in inducing the poor, who have no room in their own homes for the proper disposal of the dead, to use it, has hitherto been very great. Indeed, only one body has as yet been taken to it; and when the necessity for the removal of a corpse from a house has been pressed by the Medical Officer of Health, the relatives of the dead have preferred to carry out speedy, and indeed almost immediate, burial rather than sanction removal to the mortuary.

The locality of the hospital has already been referred to. It should, however, be further stated that since it has been used for its present purposes, a populous neighbourhood has sprung up to the north of it, within a distance varying from about 30 yards to 200 yards from the premises. The area to the south still remains unoccupied. No records of sickness are procurable in Wigan, and even were such statistics available, they would, in view of the large amount of scarlet fever prevailing in the borough, and the small number of patients received into the hospital, not be of much value in affording evidence as to any special influence which the hospital may have exercised for good or evil on the neighbourhood in which it is situated. The following is, however, the information procurable. I have the assurance of the Medical Officer of Health that during the severe epidemic of scarlet fever in 1879 and 1880, the district around the hospital remained singularly free from the disease. The disease was most intense in the four months, September to December 1879 inclusive, and during that period all the 12 cases admitted into the hospital in 1879 were under treatment there. A careful examination of the death returns for the borough during those four months, enabled me to ascertain the distance from the hospital at which 67 out of a total of 72 fatal attacks occurred. In the remaining five cases it can only be stated that they occurred at least 600 feet away, some indeed probably over a mile away.

## Distance from Hospital.

## No. of Fatal Attacks.

One and a half miles distant...	...	...	...	...	...	2
One mile distant	...	...	...	...	...	8
Three-quarters of a mile distant	...	...	...	...	...	14
Half a mile distant	...	...	...	...	...	6
Over a quarter of a mile distant	...	...	...	...	...	28
Over 900 feet distant	...	...	...	...	...	6
Over 600 feet distant	...	...	...	...	...	2
Over 240 feet distant	...	...	...	...	...	1
						67

It should also be recorded that not a single death from scarlet fever is registered as having occurred in either of the two principal thoroughfares down which the ambulance almost necessarily travelled on its way to and from the hospital.

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The rent paid for the hospital premises is 20*l.* a year. The fittings and furniture cost somewhat under 100*l.* The current expenses, including the cost of collecting and disinfecting infected clothing and other articles, during the two years 1878 and 1879 were as under:—

Cost of main- tenance, &c.		1878.	1879.
		£ s. d.	£ s. d.
Salary and board wages to care-keeper and nurse	...	120 0 0	120 0 0
Rent	... ..	20 0 0	20 0 0
Coals and gas	... ..	19 7 7	13 12 0
Wages for collecting infected clothing	... ..	9 19 7	—
Flannel	... ..	3 19 9½	—
Medical attendance...	... ..	11 14 6	5 10 3
Soap, brushes, &c.	... ..	7 1 8	0 18 0
Rates and taxes	... ..	3 9 0	3 9 0
Patients' keep	... ..	2 17 1½	14 14 7
Sundries	... ..	1 17 8	0 19 5
		200 6 11	179 3 3
Special expenses—			
Two hand-carts	... ..	19 10 0	—
Shed for ditto	... ..	8 5 0	—
Nurse	... ..	—	2 10 0
		228 1 11	181 13 3

WOLVERHAMPTON URBAN SANITARY DISTRICT.

Population in 1881, 75,738. Rateable value, 200,000*l.*

Temporary  
hospital during  
small-pox  
epidemic.

Until the year 1871 no provision was made by the Urban Sanitary Authority for the isolation of cases of infectious disease. In that year, however, small-pox became epidemic, and a large building in the centre of the town was converted into a hospital for the reception of small-pox patients.

On the termination of the epidemic, the building in question was wanted for a public library, and difficulties as to procuring a site for the erection of a hospital having occurred, the Sanitary Authority made an arrangement with the authorities of the South Staffordshire Hospital for the reception into the wards of that institution of such cases of infectious disease as in the opinion of the Sanitary Authority needed isolation. Fourteen beds were always to be at the service of the Sanitary Authority, by whom a fee of 3*l.* 3*s.* per patient was to be paid; this fee to include medical attendance by the hospital staff.

Infectious  
wing at South  
Staffordshire  
Hospital.

The accommodation provided for infectious diseases at the South Staffordshire Hospital consists of a separate wing, which beyond being continuous with the main building has no communication with it. The wing consists of two stories communicating with each other by means of a staircase. On each floor are four wards; three of these are arranged for three beds each, and the remaining ward is for a single patient. There are thus 20 beds in all. The wards are lofty, and they are well lighted and warmed. They are also provided with fair means of ventilation, but in none of them are the windows in opposite walls so as to ensure cross current of air. The floors are of oak, which is kept polished. On the ground floor is a kitchen, a scullery, a bath-room fitted with movable bath, a sink, a watercloset, and a



nurse's sitting room. On the upper story the administrative and other apartments are very similar to those on the ground floor; the single ward being, however, generally reserved as an additional nurse's room; thus reducing the number of beds available for patients to 19. The soil-pipe and the waste-pipes are in direct communication with the main drain and no drain ventilation is provided. The meals for the patients and nurses are all brought from the main building, but during the process, as indeed in every arrangement for the administration of the infectious wing, certain rules have to be observed which go to lessen the danger of infection being carried into the general wards. There is no separate recreation ground for the patients suffering from infectious diseases; neither is there a separate laundry although certain precautions are adopted with a view of preventing any linen coming from the infectious wards from mingling with that belonging to other parts of the institution.

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Since the Urban Sanitary Authority have made use of the infectious wing at the hospital, it has only once been full, namely in 1878, when they sent in 21 cases of enteric fever. And during the same period it has never occurred that more than two infectious fevers have been admitted from without at the same time, one being treated on one storey the other on the other storey. Cases of erysipelas, nearly all brought from the general wards, have, however, occasionally added a third to the number of diseases under treatment at one and the same time, and I am confidently assured that notwithstanding the construction of the wing, admitting as it does of direct communication between the two floors, there has never been any spread of infection from one patient to another. It is also stated that infection is not as yet known to have been conveyed from the infectious to the general wards.

Admission of  
patients.

The total number of cases treated in the infectious wards, and the total fatal attacks in the borough from certain specified causes, during the three years 1877-79, has been as under—

	1877.		1878.		1879.	
	Fatal attacks in borough.	Cases admitted from all sources.	Fatal attacks in borough.	Cases admitted from all sources.	Fatal attacks in borough.	Cases admitted from all sources.
Scarlet fever ...	224	33	40	10	17	14
"Fever" ...	20	1	26	27	9	5
Small-pox ...	1	1	—	—	—	3
Erysipelas ...	—	15	5	12	3	3
Other diseases ...	?	—	?	1	?	9

For the years 1877 and 1878 no precise information could at the date of my visit be procured as to the number of cases sent in by the Urban Sanitary Authority. It was, however, roughly estimated that they constituted about one fourth of the whole, and in 1879, they numbered 12, namely, seven scarlet fever, one enteric fever, three small-pox, and one tonsillitis, out of a total of 31. The total admissions, however, from all sources bear but a small proportion to the amount of infectious disease which has prevailed in the borough. Thus, whereas as many as 281 fatal attacks from scarlet fever were registered in Wolverhampton in the three years above referred to, only 57 cases were admitted into the infectious wards of the hospital, and these included some sent in beyond the limits of the borough.

It is of course impossible that 19 beds, some of which are in frequent use for the isolation of cases of erysipelas, &c. arising in the general

Insufficiency  
of accommo-  
dation.



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Value of  
isolation.

Failure to  
isolate scarlet  
fever.

Repayments  
to Sanitary  
Authority.

Public Health  
Act, 1875,  
sec. 124.

Arrangement  
made :—  
(a.) by Heath  
Town Urban  
Authority.

(b.) by Willen-  
hall Urban  
Authority.

wards of the hospital, and which are also available for infectious cases from a large portion of South Staffordshire, can suffice even for the more urgent wants of a borough, which has a population of about 76,000 consisting to a large extent of the labouring classes, whose houses necessarily cannot afford means for the isolation of any cases of infectious fevers occurring in them. The Corporation, however, believe that they have in several instances stayed the spread of infection by removal of the sick to the hospital, as for example in 1878, when they succeeded in isolating 21 cases of enteric fever, and on several separate occasions when small-pox has been imported. Where this result has been obtained, it has been mainly due to the receipt of an early intimation that infectious disease was prevalent, and with a view of obtaining this early notification more frequently, they have recently made an arrangement with the poor law medical officers of the borough, by which an immediate notice of the occurrence of infectious disease amongst paupers will be communicated to the Medical Officer of Health. As regards scarlet fever, by far the most fatal of the infectious fevers during recent years, it is stated that the disease has always spread beyond the limits of control, before the Medical Officer of Health has received any intimation of its prevalence, and the Corporation allege that as they are powerless to deal with it under existing circumstances, no special effort has been made to stay its spread by providing means of isolation adequate to that end.

Hitherto all cases sent into the South Staffordshire Hospital for sanitary purposes, inclusive of paupers, have been paid for by the Sanitary Authority, and although in some few cases the social status of the patients would have warranted them in seeking repayment, it has not been considered advisable to do so.

In no instance has any action been taken under section 124 of the Public Health Act, 1875, although some difficulty has occasionally been experienced in inducing patients and their friends to consent to removal to hospital. One difficulty, which in certain instances has not been overcome, has been that attendant upon removing the sick from the care of medical practitioners of their own selection.

The Urban Sanitary Authority of Heath Town (population 6,244), whose district adjoins Wolverhampton, refer to an arrangement with the managers of the South Staffordshire Hospital, and in a return to the Local Government Board they state that nine beds are to be at their disposal. [It will be remembered that the Wolverhampton Urban Authority claim 14 out of the 20 beds available.] No case was sent in by the Heath Town Authority during a recent epidemic of scarlet fever when means of isolation were much needed.

The Urban Sanitary Authority of Willenhall (population 16,067), whose district lies some three miles from Wolverhampton, have also since 1877 made an arrangement for the use of the infectious wards of this hospital. During an epidemic of scarlet fever in 1880, however, no cases were sent in. Indeed, at one period of the epidemic, all the beds were in use.

The infectious wing at the South Staffordshire Hospital with its 20 beds is therefore deemed available for the requirements of three urban districts having collectively a population of some 98,000 persons, consisting largely of a class who are without proper means for the isolation of cases of infectious diseases in their own homes.

#### WORKINGTON URBAN SANITARY DISTRICT.

Population in 1881, 13,305. Rateable value (1880), 22,000*l*.

Provision of  
hospital due  
to small-pox  
epidemic.

Owing to an outbreak of small-pox early in 1874, a wooden hospital was erected by the Urban Sanitary Authority of Workington. The



building was hurriedly put up, and was finished within three weeks of its being commenced. When completed only one case of small-pox remained, the patient being a pauper who was isolated elsewhere by the guardians of the Cockermouth union. In 1875 the first patient was admitted. He, however, remained in for a few days only, it being ascertained that he was not suffering from any infectious disease.

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Dr. Thorne.

The hospital consists of a single hut on brick foundations, and a few outbuildings occupying about half an acre of land in a fairly isolated position about a quarter of a mile out of the town. The site is enclosed on three sides by a hedgerow, and on the other by an open wooden railing. The walls of the hospital hut are about 6 inches thick, and consist of two layers of wood; the outer boards overlapping each other, the inner ones being tongued and grooved. At one end of the building is an entrance lobby, a kitchen, a "keeper's room," and pantry, &c. There is only one ward, which is unfurnished; it is 50 feet in length, 28 feet in breadth, and about 13 feet in height. Down the centre of the building the ceiling is incomplete, the ward being in communication with a space beneath the roof, which has ventilating shafts into the outer air. The ward is, however, divided into eight separate compartments, four on each side, by means of wooden partitions 7 ft. 6 in. high; each compartment having a double hung sash window, and a door opening into a passage down the centre of the ward. Each compartment has a floor space of 124 square feet, and is open above. At the further end of the ward are two pail-closets, not as thoroughly cut off from the wards as they should be.

Hospital  
buildings.

Owing to the hurry in which the building was erected the materials were evidently not very carefully selected, and spaces now exist in the woodwork of the walls and floor admitting both wind and rain. The building has no means of warming beyond the fireplaces in the kitchen and keeper's room; it is undrained; and it has its water-supply from an Abyssinian pump-well sunk to a depth of about 18 feet into a gravelly soil. An excellent supply of water from Crummock Lake will, however, shortly be within easy reach of the hospital. In addition to the main building is a wooden deadhouse; a brick structure fitted with a furnace for the purposes of "disinfecting" by means of heat and sulphur fumes; and a pail-closet.

Imperfect  
nature of  
building, &c.

Until recently the building was shut up, but, owing to its having been damaged by tramps, it is now in the charge of an old naval pensioner, who resides there rent free and uses the ground around the building for the purposes of a garden.

The population of Workington consists to a large extent of the working classes, who in their houses have no proper means for isolating cases of infectious diseases.

Failure to use  
hospital.

During the four years 1876-79, the deaths registered in the urban district have included the following:—

—						"Fever."	Scarlet Fever.	Diphtheria.
1876	...	...	...	...	...	2	1	—
1877	...	...	...	...	...	7	—	—
1878	...	...	...	...	...	3	—	—
1879	...	...	...	...	...	7	2	1

The original contract for the hospital buildings was 385*l.* 9*s.* 9*d.*, but, together with some alterations, the cost was as nearly as possible 500*l.* An annual ground rent of 3*l.* 6*s.* 8*d.* is paid for the site, which is held from year to year.

## APPENDIX A.

## METROPOLITAN ASYLUMS DISTRICT.—FEVER AND SMALL-POX HOSPITALS.

## RULES REGULATING THE VISITING OF PATIENTS.

I.—The visiting of patients in these hospitals is limited to the nearest relatives and intimate friends of patients dangerously ill. One visitor will be allowed daily to each of such patients. Such visits can only be made with the permission of the Medical Superintendent, and will be limited in duration to a quarter of an hour, except in very urgent cases, when two visitors will be allowed, and the duration of the visits may be extended.

II.—Notice will be sent to the nearest known relatives or intimate friends of patients dangerously ill, with an intimation that they may be visited. Such notice will be accompanied by a copy of the regulations under which visits can be made.

III.—A list of patients dangerously ill will be sent daily at 1 o'clock by the Medical Superintendent to the gate porter, to enable him to answer inquiries.

IV.—Visitors are warned that they run great risk in entering the hospitals. No one should attempt to enter the wards of a Small-pox Hospital without having been previously properly re-vaccinated, and if he lives in the house where small-pox has occurred, he is urged to apply at once to the public vaccinator (whose address can be obtained from any of the parish officers) in order that the remainder of the occupiers of such house may be vaccinated.

V.—Visitors are advised—

- (a.) Not to enter any of the wards when in a weak state of health or in an exhausted condition.
- (b.) To partake of food before entering the hospitals.
- (c.) To avoid touching the patient or exposing themselves to his breath, or to the emanations from his skin.
- (d.) To sit on a chair at the bedside, at some little distance from the patient, and not to handle the bedclothes.

VI.—Visitors will be required to wear a wrapper (which will be provided at the hospital) to cover their dress when in the wards, and to wash their hands and face with carbolic soap and water before leaving the hospital, or to use some other mode of disinfection, at the discretion of the Medical Superintendent.

VII.—Visitors are strongly urged not to enter any omnibus, tram-car, or other public conveyance, immediately after leaving the hospitals.

BY ORDER OF THE MANAGERS.

15th December 1877.

## APPENDIX B.

## INSTRUCTIONS for the DISINFECTION of the HOMEKTON FEVER HOSPITAL recently used as a SMALL-POX HOSPITAL.

WARDS, &c.—1. Wards, including nurses' sitting-rooms, sculleries, bath-rooms, closets, lavatories, linen cupboards, and linen shoots, to have their windows, doors, chimneys, and ventilators completely closed, and to be emptied of all moveables excepting the blinds and the windows.

2. Then burn sulphur in an atmosphere of steam for 48 hours, so as to permeate all the above-mentioned places.

3. The windows having been entirely taken out, the wards and adjoining rooms are to be exposed for 14 days to wind and weather.

4. Remove wash from ceiling, and then whitewash it. Wash well down the walls. All woodwork to be thoroughly washed with soap and water, and the floors to be well scrubbed. The walls and woodwork should be washed well at least twice. After the painting, the floors should be well scrubbed three times, at intervals of three days. *The hoppers and ventilators should be specially looked to.*

5. Now fix the windows, new sash lines having been supplied, and commence painting, which should consist of at least three coats.



**FURNITURE.**—1. The venetian blinds to be taken to pieces and well washed with soap and water, dried in the open air, and re-painted, new tapes and cords being supplied.

2. Bedsteads to be taken to pieces and well washed and re-painted. Sacking to be washed and dried in the open air.

3. Beds, pillows, and bolsters to be emptied, and the feathers to be washed with superheated steam at a temperature of 300° for 20 minutes, and dried for three hours at a temperature of 250°. All the linen, ticks, blankets counterpanes, draw-sheets, shirts, chemises, night-dresses, towels, handkerchiefs, nightingales, and squares to be steeped in fresh water one week, the water to be three times changed, then to be boiled in different waters twice, and afterwards washed and dried in the open air, but the blankets and nightingales are to be subjected to a dry heat of 230° and not boiled.

4. Night stools, bed-tables, chairs, bed-boards, tables, cupboards, presses, and racks to be exposed in the open air for 14 days, then well scrubbed with soap and warm water, roughly wiped, and left to dry in the open air.

5. *The seats of the night-stools and the seats of all the water-closets to be planed.*

6. All sinks, sluice-pans, and closets to be flushed.

7. Crockery and medicine bottles to be thoroughly washed in boiling water. *The feeders in particular to be boiled, and the spouts cleaned out with a brush.*

8. All brooms, brushes, scrubbing-brushes, knee-rests, flannels, dusters, and sponges used in the small-pox period, and any tow, lint, or cotton-wool which may have been in the wards to be destroyed; also all mats, and oil cloths, and carpets in the wards or the sitting-rooms of the nurses.

9. Slop-pails and tubs to be steeped in fresh water for 24 hours, exposed to wind and rain, washed in warm water and soap, and dried in the open air and re-painted. All rags and cloths used in connexion with these to be destroyed.

Books, papers, toys, &c. to be destroyed or sent to a small-pox hospital.

**CLOTHING.**—1. Men's and women's underclothing to be steeped in fresh water for a week, twice changed, then washed and dried in the open air. It would be desirable, however, to send these things to a small-pox hospital for use, as they do not stand boiling well.

2. Boots and shoes used by small-pox patients to be sent to a small-pox hospital or destroyed.

3. So far as possible, the clothing of officers, nurses, and servants worn in a small-pox ward to be steeped in fresh water for a week, then washed, boiled and dried in the open air. Clothing so worn which cannot be so treated to be destroyed.

**RECEIVING ROOMS.**—1. To be treated in the same way as the wards, *but new baths to be supplied.*

2. New carrying chairs to be supplied.

**GENERAL.**—1. All the furniture in the asylum, other than that in the wards, to be cleaned in the ordinary way.

2. The rooms and offices of officers, nurses, and servants, where paper exists, to be re-papered after removal of old paper, wood-work to be washed and re-painted, and in other respects cleaned, in the ordinary way.

3. Carpets and curtains, beds, bedding, sheets, linen generally, and blankets, and all furniture in officers' and servants' rooms to be thoroughly cleaned.

4. All rooms, passages, corridors, pantries, store-rooms, linen-rooms, stairs and staircases, water-closets, lavatories, and bath-rooms in the administrative departments to be well washed, as to the wood and stone-work, and the wood-work to be re-painted, and white or lime-washed where such was the case before.

5. Mortuary and post-mortem room to be fumigated with sulphur and steam, well washed down, exposed to the atmosphere, and re-painted.

**KITCHEN.**—Well washed, exposed to the atmosphere, lime-whited and re-painted. All utensils employed there to be thoroughly cleaned.

**STEWARD'S DEPARTMENT.**—Store-rooms and offices to be thoroughly cleaned in the ordinary way.

APP. NO. 1.

On the Use  
and Influence  
of Hospitals  
for Infectious  
Diseases, by  
Dr. Thorne.

MATRON'S DEPARTMENT, LINEN AND STORC-ROOMS.—Simple cleaning.  
LAUNDRY.—Simple cleaning.  
DISINFECTING CHAMBERS.—Simple cleaning.  
PATIENTS' CLOTHES' ROOM.—Wooden framework to be taken out and  
burnt, to be thoroughly fumigated with sulphur and steam, exposed to the  
air for 14 days, well washed, and wood-work re-painted.  
DUST-HOLES AND DUST-SHOOTS.—To be cleaned.  
ROADS.—Fresh gravel.  
In a word, whatever has been in contact with small-pox must, if  
possible, be cleaned ; what cannot be cleaned must be got rid of.  
ALEX. COLLIE.

APPENDIX C.

BOROUGH OF LEICESTER.

TABLE showing the DEATHS from SCARLET FEVER together with CASES  
NOTIFIED and REMOVED to HOSPITAL since the compulsory notifica-  
tion of infectious diseases came into operation.

Date.	Deaths from Scarlet Fever.	Cases of Scarlet Fever notified to the Sanitary Authority.	Cases of Scarlet Fever admitted into Hospital.
Sept. 12th to Dec. 31st, 1879	64*	499	159
1880 ... ..	117*	802	230
1881 ... ..	152	1,065	387

\* Including deaths in Borough Fever Hospital, which lies outside the borough limits.

APPENDIX D.

BOROUGH OF WARRINGTON.

TABLE showing CASES of SCARLET FEVER NOTIFIED to SANITARY AUTHO-  
RITY and REMOVED to HOSPITAL since 1880.

Date.						Cases notified.	Cases admitted to Hospital.
1880	June	...	...	...	...	2	1
	July	...	...	...	...	3	2
	August	...	...	...	...	22	20
	September	...	...	...	...	7	74
	October	...	...	...	...	10	9
	November	...	...	...	...	7	7
	December	...	...	...	...	11	8
1881	January	...	...	...	...	4	3
	February	...	...	...	...	4	4
	March	...	...	...	...	3	3
	April	...	...	...	...	10	9
	May	...	...	...	...	6	6
	June	...	...	...	...	7	7
	July	...	...	...	...	19	15
	August	...	...	...	...	38	36
	September	...	...	...	...	66	60
	October	...	...	...	...	83	57
	November	...	...	...	...	69	49
	December	...	...	...	...	53	32
1882	January	...	...	...	...	42	26
	February	...	...	...	...	25	21



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## LIST OF SANITARY DISTRICTS VISITED OR REFERRED TO.

[The Authorities of the Districts printed in *Italics* have taken no part in providing Hospital Accommodation of their own, either separately or in combination with any other Authority, but have an arrangement of some sort for the reception of Patients from their Districts into Hospitals belonging to other bodies.]

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On the INFLUENCE of the FULHAM SMALL-POX HOSPITAL on the  
NEIGHBOURHOOD SURROUNDING IT, by MR. W. H. POWER.

This report, which is intended to be read with the report of Dr. Thorne's more general inquiry as to the use and influence of Hospitals for Infectious Diseases, will be more particularly concerned with certain allegations that large small-pox hospitals are dangerous to the neighbourhoods in which they are situated.

The circumstances of the Fulham Hospital probably have a broad resemblance to those of other London small-pox hospitals in respect of the subject of these allegations; and the lessons to be learned from the present inquiry will probably not be without their application, *mutatis mutandis*, to small-pox hospitals in other parts of the country.

The hospital is situated on land adjoining Seagrave Road, Fulham. The plot of land on which it is built is one of two sites purchased some eight years ago by the Managers of the Metropolitan Asylums District, partly for the sake of having ready beforehand ground whereon small-pox hospitals could be speedily erected in the event of emergency, but also with a view to completing the Managers' scheme of hospital provision for small-pox in the Metropolis. This scheme contemplated the establishment in London of five hospitals which should not only serve the total small-pox requirements of the Asylums District, but should also be so distributed in it as to discountenance complaint, such as had already been made by inhabitants of a particular district, that a hospital in their midst had been unduly used for accommodation of small-pox cases from remote parts of London. The Fulham site comprises  $6\frac{1}{2}$  acres, and was inclosed as soon as purchased; but, pending need for its use, it was let by the Managers to a market gardener, due security being had for re-entry at short notice. In October 1875 the Managers determined, in regard of a recommendation of a Select Committee of the House of Commons appointed to consider their action respecting the small-pox hospital at Hampstead, to erect forthwith on this Fulham site certain administrative buildings which should form the nucleus of a small-pox hospital. It was judged that pavilions, which did not require to be permanent structures, for the accommodation of small-pox cases could be added at short notice as occasion might require. Need for pavilions quickly arose. In October 1876 it became obvious that the Metropolis was destined to undergo another epidemic visitation by small-pox. Hereupon consideration was given both to the nature and amount of accommodation to be afforded at Fulham, and finally it was decided to provide for 300 small-pox cases in 10 permanent pavilions. These were built in 1876-77. Certain exigencies of site necessitated departure from uniformity in length of the pavilions, and thus five came to occupy an area of  $144 \times 25\frac{1}{2}$  feet, while other five measured  $133 \times 25\frac{1}{2}$  feet. In every pavilion the accommodation finally afforded amounted to about 120 square feet floor space, and about 2,000 cubic feet per bed. The pavilions were built on concrete foundations, with slate roofs, and brick piers in cement, and corrugated-iron sides with felt and matchboard linings. They are all  $17\frac{1}{2}$  feet high or thereabouts. Each pavilion was provided with ward kitchen, lavatory, and latrines. The hospital was efficiently drained to the district sewer at Lillie Bridge, and was provided with water from the Chelsea Water Company's Works. Before the hospital could be completed need for it became urgent, especially in regard of males suffering from small-pox. Accordingly it was decided to devote five pavilions as soon as finished to the reception of male patients. On 10th March 1877 the



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hospital was opened; at first for reception of "convalescents" from other hospitals, but a week later it began to receive acute cases. For a while the whole business of the institution (including nursing) was performed by men; but on the reception in May, after completion of the other five pavilions, of female patients, women nurses and female ward-servants were transferred to Fulham from the Fever Hospital at Homerton, which had recently been closed for cleansing and disinfection after a temporary use for small-pox cases. Though all the ten pavilions at Fulham were completed by May 1877, eight only were devoted to patients. Two, pending the full equipment of the hospital, were used as dormitories for nurses and attendants. [This arrangement was continued until the outbreak of the present year, when additional dormitories having been erected, the two pavilions reverted to their original purpose.] By June 1877 the number of patients in hospital had reached its highest, 140-150, after which with decline of small-pox generally it quickly diminished, until in October admission of cases was discontinued and the staff of the hospital much reduced. No more acute cases were admitted in 1877, though in November and December some 60 convalescents were received from Stockwell Hospital. At the end of the year 15 of these convalescents remained in hospital at Fulham. Early in 1878 there was a rapid increase of small-pox in London, and admission of acute cases to Fulham was recommenced. Convalescents, too, continued to be received until April, in which month the number of cases admitted in a single fortnight reached its highest point for the year, viz., 140 patients in various stages of the disease. From June small-pox declined rapidly in London, and by August admissions to Fulham had almost ceased. No particular need for the hospital appeared until January 1879, when steady increase of small-pox in the Metropolis brought it again into requisition. By March the fortnightly admissions were above 50, and the total number in hospital was above 100; representing a prevalence of small-pox that was fairly maintained until July, when rapid decline of the disease in London soon left little use for the hospital. Thenceforward and during great part of 1880 the hospital was but little needed. In the latter year the fortnightly admissions only once reached 30, and on two occasions only did the number of patients in hospital at the end of a week exceed 50. But in December 1880 rapid increase of small-pox in East London proved the commencement of the fresh epidemic of the disease that is still in progress, and that appears likely to prove more serious and extensive than any witnessed in the Metropolis since 1871. To this outbreak, so far as it has affected Chelsea, Fulham, and Kensington, close study has been given.

My inquiry into the relations of Fulham Hospital during the present epidemic was begun on 17th January 1881, and was continued day by day during several weeks. It had to do first of all with the circumstances of the hospital, and of the district round about it, and with the uses to which Fulham Hospital was being put at the date of inquiry; and the investigation has extended to the relations of the hospital with the district adjoining it, and the state, past and present, of small-pox in the Metropolis and in Chelsea, Fulham, and Kensington.\*

Fulham hospital occupies a site that, from the view point of medical knowledge at the time of its selection, was singularly free from objection.

\* Chelsea and Kensington are single parishes, each under the sanitary government of its vestry. Fulham is technically a "district," and comprises St. Peter and St. Paul Hammersmith, along with Fulham proper, but for brevity's sake, I shall in this report speak of Fulham district as a parish, and of its district board as its vestry.



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With few exceptions there are not within 500 feet of the limits of the hospital grounds any inhabited dwellings. And not only is much of the ground immediately adjoining the hospital as yet unbuilt on, but most of it is so circumstanced as to render it very unlikely to be built on in any near future. North of the hospital and continuous with its boundary on this side, is the Lillie Bridge Running Grounds, some 700 by 450 feet in extent. To the southward, separated from the hospital by a strip of market garden, are the grounds of the London Athletic Club, of even greater area than the Lillie Bridge Grounds. On the east is a cutting containing the West London and District Railways, and separating the hospital site from the Brompton Cemetery. This occupies for a breadth of 200 yards almost the whole space intervening between the Richmond Road on the north-east, and the Fulham Road on the south-east of the hospital. To the westward alone is there land likely to be used for building purposes; and much of that land is at present market-garden ground or is open uncultivated land but little built on, so that the number of existing dwellings within 500 feet of the hospital boundary is trivial. Outside the 500 feet limit, and up to the quarter-mile radius from the centre of the hospital, houses, though more plentiful, number only a few hundreds; but beyond the quarter-mile limit they completely encompass the hospital on all sides. Southward and westward towards the river, Putney, and Hammersmith, the belt of houses surrounding the hospital at this distance is in parts comparatively narrow or inconsiderable; but in other directions it is practically continuous with the dense population of Kensington, Brompton, and Chelsea. Again, as regards traffic routes, the hospital is greatly isolated. It is placed at the blind end of Seagrave Road, a quarter of a mile from the junction of this road with the Richmond and Lillie Roads. By these roads alone can ambulances and other wheel traffic reach the hospital.

By January this year, after comparative absence of several months, small-pox had once more become epidemic in the Metropolis. The number of admissions fortnightly to the small-pox hospitals of the Metropolitan Asylums District, which from 29 in October had risen to 80 by the end of November, had further increased to 219. So far these admissions had been mainly from Bethnal Green, Hackney, Greenwich, and adjoining eastern parishes, though signs were not wanting of commencing prevalence of small-pox in central and southern parishes of the Metropolis. As yet, however, many of the parishes intervening between Chelsea with Kensington and the east end of London where small-pox was rife, were notably free from disease. In the fortnight ending 8th January, the parishes of Paddington, St. Marylebone, St. Giles and St. George, and Westminster did not contribute a single case of small-pox to any hospital, while St. George's Hanover Square, and Hampstead each contributed only one, St. Pancras, and Strand each only two, and Wandsworth with Clapham three cases. In the same fortnight Chelsea and Kensington, which in the preceding four weeks had not furnished a single case, contributed one each; while Fulham itself, which in the preceding six weeks had afforded only one patient, contributed no fresh case. At this time, therefore, small-pox in the Metropolis was very unequally distributed. The disease had acquired a serious degree of intensity in East and South-east London; was sparingly if increasingly prevalent in certain middle districts; while at the West End of town it could hardly be said to exist. In Chelsea, Fulham, and Kensington, the westernmost parishes of all, there was perhaps less small-pox than had existed at any one time during several years. This state of affairs seemed to indicate that West London generally, if about to suffer at all from epidemic small-pox, would do so only in sequence



to the central districts which as yet had scarcely commenced to suffer; and that, therefore, there was no warrant for apprehending that the disease was about to become seriously prevalent at any early date in Chelsea, Fulham, or Kensington. There was, indeed, room for doubt whether the three parishes in question would afford material for any serious epidemic of small-pox. A few months only had elapsed since the disease had, so to speak, burnt itself out in them after nearly four years of frequently repeated prevalence, and during these years near upon 2,000 persons had been attacked by the disease, while a still greater number had been vaccinated for the sake of protection against it. At the very least it seemed probable that in these parishes an epidemic of small-pox could not easily be again set going.

Concurrently with the rapid increase of small-pox in East London, Fulham Hospital, which had remained closed for some weeks, was again prepared for the reception of patients; and it was arranged to use it for small-pox cases that might arise in 13 specified metropolitan parishes, chiefly of Middle and West London. The hospital was thus re-opened on 13th December 1880. At this date, however, the number of cases of small-pox occurring in the 13 parishes was insignificant, and it was therefore determined that Fulham Hospital should at once be further devoted to reception of surplus cases from the over-taxed hospitals of the East End. Accordingly, on the 13th and 14th December, 40 persons convalescent from small-pox were transferred to Fulham from Homerton, and similar drafting of convalescents was continued from time to time until, by January 17th, when this inquiry began, 110 such cases had been received there from Homerton and Deptford Hospitals. Meanwhile 55 acute cases had also been admitted. Of this number, 24 had come from Islington and 11 from Holborn parishes. Other 15 were from Marylebone, Paddington, Strand, Hampstead, and St. George's, Hanover Square, while five only came from Chelsea, Fulham, and Kensington. These 55 acute cases were distributed per week as follows: from 13th to 20th December, four; from 21st to 28th December, five; from 29th December to 3rd January, fourteen; from 4th to 10th January, fourteen; and from 11th to 17th January, eighteen cases.

The results of this and other preliminary inquiry may be summarised thus:—There was here a hospital, singularly well separated from neighbouring houses of its district, and so placed that few of its neighbours but those having business at the hospital had need to go near the building. The district in which the hospital with its isolating areas stood was populous indeed, but at the time of the hospital being opened, the district had no actively spreading small-pox within it, and there was a reason for expecting small-pox not to attack it any marked manner. To this hospital, in this district, small-pox cases, both acute and convalescent, were now brought from a distance. Under these circumstances it was believed that should any considerable fresh prevalence of small-pox now occur in parts of Chelsea, Fulham, and Kensington, about the hospital, there would be little difficulty in determining whether or not, as a matter of fact, the hospital had concern in that prevalence.\* Accordingly it was to the determination of this fact that the present investigation was, in the first instance, directed: and relations of place and of time have alike been taken into account.

\* Throughout the present inquiry certain knowledge respecting the customary manifestations of small-pox, and concerning the conditions for the distribution of infectious disease among communities were held in view, and they may conveniently be stated here:—

(a.) Small-pox is a disease infectious beyond all others of its class. Not only does it spread with greater facility than, for instance, scarlatina or typhus, but the

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As regards the relations of place between the hospital and the occurrence of small-pox in those parishes, the first thing that appeared necessary was to define around the Fulham Hospital an area of size sufficient to contain several thousands of population, yet small enough for close study; to obtain early information respecting every case of small-pox occurring within this area; and to seek out at once the source of infection of each case so occurring. This was accordingly done. The area selected, which I shall in this report designate as "the special area" was that included within a circle of a mile radius from the centre of the hospital. As regards relations of time, the occurrence of small-pox has been studied during the several fortnights of its epidemic prevalence. This arrangement is convenient, not merely on account of the statistics of the Metropolitan Asylums Board, which lend themselves to no smaller time measure of small-pox in the Metropolis, but also, and mainly, because a period of two weeks represents fairly enough the interval of time individual cases of small-pox which usually elapses between the occasion of infection and the earliest manifestation of the disease.

Information as to occurrence of small-pox within the three parishes and the special area, and as to the time of its occurrence, has been obtained from the records of the Metropolitan Asylums Board and from their officers, and also from the three Vestries and the three Poor Law

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measures of isolation and other precautions against dissemination which suffice with those diseases are, as regards small-pox, altogether futile. Not only is it unsafe to place small-pox in hospital side by side with other infectious diseases, but it is also unsafe to deal with linen, blankets, bedding, &c. of small-pox patients in any but a separate laundry. Further, small-pox can without doubt be readily transmitted to others by persons who have been in close relation with the disease, though they themselves may not suffer from it; and similarly, small-pox may be transmitted with comparative readiness in clothing, parcels, &c. from an infected to a previously uninfected dwelling. Given a case admitted by chance into the wards of a general hospital, it is not the patients of the particular ward (as in the case of scarlatina or typhus) to whom risk of contracting the disease is confined. Again, the disease is capable beyond others of infecting susceptible persons after the briefest exposure to its contagion. Probably a very few minutes' close relation with acute small-pox will suffice in most instances for infection of a person unprotected by vaccination or by previous attack of small-pox. Lastly, small-pox has (and herein it resembles other diseases of its class) a habit of altering its behaviour in a community, and of becoming epidemic after a period of quiescence, in a way that is probably not wholly accounted for by the accumulation of susceptible people, and by the varying opportunities afforded to it. At its epidemic periods, its power of diffusing itself is most marked at the commencement of the epidemic.

- (b.) Cases of small-pox, themselves so little serious as to be mistaken for "chicken-pox," have in our ordinary experience the power of producing in unprotected persons severe attacks of the disease. And other slight cases of small-pox, not mistaken but purposely concealed, do much in all experience to spread the disease in an epidemic form. Plenty of illustrations of these statements have occurred in the period under review, and have been amply reported by the local health officers.
- (c.) However positively an infectious disease hospital may have operated in communicating infection to the district around it, it is in the nature of things that the proof of such operation must become less and less complete as an epidemic in the neighbourhood progresses. For the first group of cases distributed about the district will, here as elsewhere, have subsequent cases arising round them, and distinction between the hospital itself and the first-distributed cases as causes of the subsequently arising cases will not easily be made; and this difficulty of identifying the causative influence of the hospital must needs go on increasing with each fresh batch of cases in the district. It is for this reason that the present report will not record the results of inquiry case by case later than the 5th of February; for it came after that time to be seen that a considerable proportion of small-pox cases in the special area were in persons who had had more or less opportunity for getting small-pox in a common-place way by communication with persons or things previously infected.



Authorities having sanitary and other jurisdiction therein. And further some 200 gentlemen having medical practice in the area were appealed to for help in the inquiry by giving private information respecting all cases of small-pox coming under their notice within a mile of the hospital between Christmas 1880 and Lady-day 1881. Ready and prompt assistance was and has continued to be rendered by the hospital officials, and by the officers of the vestries and unions concerned, and many medical men have been good enough to take interest in and help forward the inquiry. Upon the whole it is believed that very few small-pox cases in the special area have escaped notice, and this conclusion derives support from the result of house-to-house inquiries undertaken by each of the vaccination authorities during the period under investigation. These inquiries did not bring to my knowledge more than some half-dozen small-pox cases that had not been reported to me from other sources.

In speaking of times of "occurrence" of small-pox cases during the existing epidemic, for which the dates could (by special questioning of patients and friends by the Resident Medical Superintendent and myself), be learnt with greater nicety than by any records, I shall mean the time of attack of the several patients. But for other epidemic periods "occurrence" of cases will necessarily signify the time when they first came under observation, namely, the time of their admission to hospital. The distinction will deserve to be kept in view by the reader of the report.

I would now recall the state of small-pox in London and in the neighbourhood of the hospital at the date of commencement of inquiry. The following table gives the main facts already recorded, with certain additional information:—

TABLE I. (a.)

Fortnightly Periods ending	Small-pox Mortality of London.	Total Admissions into Small-pox Hospitals of the Metropolitan Asylums District.	Total Admissions to Fulham Hospital.		Incidence of Small-pox on Chelsea, Fulham, and Kensington.			
			Acute Cases.	Convalescent Cases.	On whole of the Parishes.		On Parts within One Mile of the Hospital.	
					Cases attacked.	Houses newly invaded.	Cases attacked.	Houses newly invaded.
11 December 1880 ...	22	181	—	—	—	—	—	—
25 " " ...	48	152	8	40	—	—	—	—
8 January 1881 ...	50	219	24	70	4	4	2	2
22 " " ...	69	227	48	22	7	7	5	5

Thus, after the opening of the Fulham Hospital, attacks by small-pox in Chelsea, Fulham, and Kensington, which were nil in the fortnights ending 11th and 25th December, had, by 22nd January 1881, become 11 in number. All these cases had occurred in separate households, and seven of them were in households in the special area. It was not until the hospital had been opened nearly three weeks that any case of small-pox occurred in this area. Inquiry respecting these seven cases resulted as follows: Six of the seven had resided at least half-a-mile from the

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hospital, and five of the seven occurred in households widely separated from one another. One of the seven persons was already developing small-pox on arrival in Chelsea after a visit of several weeks at Islington. A second was believed to have visited at a house where there was small-pox 11 days before the commencement of her own illness; while two persons, an omnibus conductor and a jeweller, had up to the date of their attack, spent more or less of their working hours in the East of London, where small-pox was rife. In regard of the other three cases, the source of infection was not traced completely:—two of the three had not, it was affirmed, been out of the district for some weeks before attack, and both denied communication of any sort with the hospital. The third case had been regarded as chicken-pox, and did not come under notice until a later time, when undoubted small-pox which occurred in the family in which this person acted as servant, revealed the true nature of this and of an intermediate case of “chicken-pox.” Antecedent to their illness, then more than half the seven cases had, or had good chance of having had, personal relation with small-pox within a period that would suffice to explain their subsequent attack by the disease; while of the remainder it seemed not unlikely that if all the facts had been obtained, their relation also to antecedent small-pox would have been discovered. This history was pretty much what had been expected. It contained no suggestion of any injurious influence from Fulham Hospital; rather it seemed, so far as it went, to confirm the belief with which, I admit, the inquiry set out, namely, that the hospital could not with justice be accused of having set going small-pox in its neighbourhood.

In the next succeeding fortnight, however, that ending 5th February, a very unexpected event took place. There occurred a great outburst of small-pox in Chelsea, Fulham, and Kensington. Fresh cases, which in the two preceding fortnights had numbered four and seven respectively, rose at a bound to 62. Of this number 47 were attacks of persons in the special area, and of the remainder 11 resided within a further half mile of the hospital. So, again, there were 56 households freshly invaded during the period, and of these 41 were within the special area, and other 11 within the further half-mile. The main facts of this outburst are given below, where the figures relating to the previous incidence of small-pox are reproduced for the sake of the contrast:

TABLE I. (b.)

Fortnightly Periods ending		Small-pox Mortality of London.	Total Admissions into Small-pox Hospitals of the Metropolitan Asylums District.	Total Admissions to Fulham Hospital.		Incidence of Small-pox on Chelsea, Fulham, and Kensington.			
				Acute Cases.	Convalescent Cases.	On whole of the Parishes.		On Parts within One Mile of the Hospital.	
						Cases attacked.	Houses newly invaded.	Cases attacked.	Houses newly invaded.
11 December 1880	...	22	181	—	—	—	—	—	—
25       "       "	...	48	152	8	40	—	—	—	—
8 January 1881	...	50	219	24	70	4	4	2	2
22       "       "	...	69	227	48	22	7	7	5	5
5 February ..	...	106	325	80	63	62	56	47	41



But this was not all; there was a very curious limitation, narrower than the table can show, of the outburst in regard of time. Of the 62 parishioners attacked during the last of these fortnights, four only commenced to be ill before the 26th January, while on that and on four succeeding days, January 26-30, 42 persons were attacked. And further, of the 42 attacks constituting this notable outburst, no less than 32 were of persons resident within the special area, and other eight of persons living within  $1\frac{1}{2}$  miles of the hospital. This limitation of the outburst both in time and in area was the more remarkable, since from what is known of the incubation period of small-pox, the persons now newly attacked must have got their infection at a time when not more than four cases of small-pox were known to have occurred in the houses of the special area, and eight only in the whole of the three parishes. Examination, therefore, of the facts as to probable sources of infection of the 32 persons attacked in the special area within the five days referred to promised to be of particular interest; and minute investigation was made of the precise doings day by day of each individual during a period 10 to 14 days before attack. The result was as follows:—in nine cases evidence could be got, or reasonable suspicion could be entertained, that the sufferer had within a fortnight of attack been in personal relation direct or indirect with small-pox. Thus, one of the nine was admitted from a house whence a case of small-pox had already been received 13 days previously; a second had visited at a house where there was "chicken-pox"; a third case was the blindmaker of the hospital; a fourth lived in a street where there had been small-pox a fortnight previously, and though he had not entered the infected dwelling, he had played with the sons of the person attacked; and a fifth case worked near the hospital and admitted having drunk beer with ambulance men at a public-house; four other of the nine cases had had, at the periods in question for each, business in quarters of London where small-pox was known to be prevalent. The story of these nine may serve to illustrate both the minuteness of the inquiry, and the nature of the suspicion which was allowed to serve for the inclusion of a case in this list. But in regard of 23 out of the 32 residents in the special area who were infected in the period January 12th-17th there was scarcely a hint to be got to account for their illness. One and all of them denied any knowledge of having been exposed to infection of small-pox. None could remember any sort of communication with the hospital or with persons connected with it; though several, with their friends, were well enough disposed to regard their illness as caused in some occult manner by the hospital.

The contrast of this history with the history of preceding fortnights was thus very marked; and the fact had to be admitted that in Chelsea, Fulham, and Kensington, parishes believed to be for the time at least little prone to small-pox, and far removed from those other quarters of London wherein the disease was actively prevalent, there had occurred an epidemic outburst of small-pox of startling suddenness and magnitude, not to be explained by reference to the usual methods of small-pox spread. For at the time when the sufferers by the outbreak must have become severally infected, small-pox was almost absent, not only from the three parishes, but also from the great and populous parishes intervening between Chelsea with Kensington on the one hand, and the eastern districts of the Metropolis on the other hand. Between 1st and 20th January there had not been more than a dozen small-pox cases admitted to the hospitals of the Metropolitan Asylums District from these intermediate parishes. Then, besides this circumstance that the disease should make choice of these parishes for so sudden a manifestation, the further fact claimed to be recognised that a special

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area, having the hospital in its centre, had suffered to a notable degree more than other parts of the three parishes. And, thirdly, the relation in point of time between the renewed importation of small-pox into the district and hospital, and the sudden appearance of small-pox in the houses of the district was a fact that forced itself on the notice of the observer. Thus it came to be seen that in this special area at this particular moment some heretofore unrecognised factor of epidemic small-pox had probably been in operation. As yet, however, there was no direct evidence that the hospital had been such factor; indeed it was seen to be quite possible that the outburst in question had been the result of a congeries of unrecognised accidents in no way immediately connected with the hospital, but which were peculiar to the particular moment. Unless, therefore, it could be shown that in other years during which the hospital was in use for small-pox there had been exceptional incidence of the disease on the special area around it, occasion for believing the hospital to have been concerned in the outbreak of 1881 did not of necessity arise. Accordingly resort was had to study of the facts of former years.

Investigation into the behaviour of small-pox in the three parishes during former years could not be made as complete as the inquiry into the facts of the current epidemic; but it had to be limited to small-pox that had been admitted to the hospitals of the Metropolitan Asylums District. Of small-pox treated in private dwellings during former years no complete record existed, while such as could be obtained was defective in a variety of particulars. Nevertheless, it is believed that *admissions to hospital alone* have sufficed for the end in view, inasmuch as since the first year of the hospital operations, they have far outnumbered the cases treated privately, and have probably borne a pretty constant ratio to the private cases. Even thus circumscribed, the investigation has been no light undertaking, for it has necessitated note of the exact address and the date of admission of each case of small-pox received during five years from Chelsea, Fulham, and Kensington into each one of the Metropolitan Asylums District Hospitals. And on account of the labour involved this investigation has not been pushed further back than March 1876, one year before the opening of the Small-pox Hospital at Fulham. As regards this hospital, the information was extracted from the Fulham Hospital books by myself, that from other hospitals by the officers of the Metropolitan Asylums Board. Division of the five years into defined epidemic periods rather than calendar years has been necessary owing to habit of small-pox of becoming epidemic during the winter and spring months. For comparative estimate of the amount of small-pox in the special area with the amount of small-pox in other parts of the three parishes, information was sought respecting the number of inhabitants year by year in each of the artificially made divisions of the total district. In this quest many difficulties were met with and some time wasted before it came to be seen that after all no very elaborate calculations were needed for settling the question of relative incidence of small-pox upon the special area and the rest of the three parishes. It was presently seen to be enough that the respective rates of prevalence within the area and beyond it should be so taken that it was impossible to overstate the rates of incidence on the special area, and impossible to understate the rate of incidence on the parts of the three parishes outside that area. And these conditions were not difficult of fulfilment. The number out of every hundred houses that became invaded by small-pox was taken as the test of the intensity with which small-pox has affected any locality; and thus the



number of houses existing within the special area has been purposely over-estimated (in order that the per-centage of houses invaded therein should not by any possibility be overstated) by assuming it to have been the same in former years as it is at the present time, viz., 11,713; while the number of houses in other parts of the three parishes has been purposely under-estimated (in order that the per-centage of houses invaded therein should not by any chance be understated) by deducting the number now within the special area from the number, 35,000, that were inhabited at the census of 1871. The method necessarily tends to the obliteration rather than the exaggeration of any difference that may have existed in the prevalence of small-pox in the respective areas, during the epidemics of 1876-80. In the following account of the various incidences of small-pox, I shall be content to speak of rates only, referring to appended tables and notes for the actual number of houses and small-pox invasions from which the rates are calculated.

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*Epidemic period 1876-77*:—Towards the end of 1875 small-pox had become all but extinct in the Metropolis. For four months, September to December inclusive, of that year not a single case of the disease was admitted to the hospitals of the Metropolitan Asylums District, and during the last quarter of 1875 six deaths only from small-pox were registered in all London. In 1876 the disease again made its appearance, but except in a few parishes, did not become extensively prevalent until autumn. In November, by which time small-pox had become widely diffused in the Metropolis, it commenced to spread in Chelsea, Fulham, and Kensington, so that in December between 30 and 40 cases therefrom were admitted in a single fortnight to the Asylums Board Small-pox Hospitals. Subsequently, small-pox in these parishes declined somewhat; but in March 1877, when the epidemic in the Metropolis reached its height, the disease further increased and continued very prevalent in them until July, when it again began to decline. Altogether, in 21 months, from March 1876 to the end of December 1877, a period comprising a whole epidemic of small-pox in London, there were invaded in Chelsea, Fulham, and Kensington 476 houses. These were distributed thus:—In the special area, 148; in other parts of the three parishes outside that area, 328. The rates respectively for these areas are as follows:—

TABLE II. (a.)—SHOWING INCIDENCE of SMALL-POX on HOUSES in CHELSEA, FULHAM, and KENSINGTON, during epidemic period March 1876 to the end of 1877.

*Rate per 100 Houses in each Area referred to.*

Whole of the three Parishes.	The Special Area.	Other parts of the Parishes outside Special Area.
1.36	1.26	1.40

In these figures there is no suggestion whatever of exceptional incidence of small-pox on the special area which contains Fulham Small-pox Hospital. But it will be remembered that this hospital was opened for the first time for reception of patients on the 10th March 1877. Until this date, therefore, Chelsea, Fulham, and Kensington had not within their limits any small-pox hospital; thenceforward Fulham Hospital, placed in the centre of the special area, continued to receive small-pox cases, not only from these but from other and distant parishes. Thus it became necessary to examine the incidence of small-pox on the

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several areas according as it was witnessed *before* and *after* the opening of this hospital. The results are given in Table II. (b.)

TABLE II. (b.)—SHOWING INCIDENCE of SMALL-POX on HOUSES in CHELSEA, FULHAM, and KENSINGTON during two periods (March 1876 to March 1877, and March 1877 to the end of 1877.

*Rates per 100 Houses in each Area referred to.*

Periods.	Whole of the three Parishes.	The Special Area.	Other parts of the Parishes outside Special Area.
March 1876 to March 1877.			
No small-pox hospital in the parishes ... ..	} .41	.15	.54
March 1877 to the end of 1877.			
Small-pox hospital in the special area ... ..	} .94	1.10	.86

In October 1877 Fulham Hospital ceased to admit small-pox cases ; in November convalescent cases from other hospitals were again transferred to it, and continued to be thus received during December 1877 and in the early part of 1878.

In the above table there is seen subsequently to the opening of the hospital, a great change in the incidence of small-pox on the two areas. In both it had increased, but in the special area the increase was seven or eight times, while in other parts of the three parishes it was not twice greater than the amount that had existed previous to the opening of the hospital. Obviously, however, this concurrence of exceptional incidence of small-pox on the special area and establishment therein of a small-pox hospital showed no relation of effect to cause. After all, the amount of small-pox in the special area during the whole period was not proportionally in excess of that on other parts of the three parishes. Both areas, too, had suffered small-pox before any hospital was in question, and both suffered more severely after than before establishment of the hospital. Hence nothing was proved but delay in incidence of small-pox on the special area, which delay was quite consistent with gradual and common-place extension of the disease from outlying parts of the parishes toward their more central parts. Still the facts were of interest.

*Epidemic period, January-August 1878.*—In January 1878 small-pox in the Metropolis which in the previous month had commenced to increase, underwent rapid development, and Fulham Hospital began again to receive acute cases. Until March these were mainly from distant parishes. But in the fortnight ending March 9th, Chelsea, Fulham, and Kensington, which since the previous autumn had never been quite free from small-pox, began to contribute in excess of other parishes. No special use of the hospital was being made for patients from those near parishes in excess of the use made for more distant parishes. But thenceforward the three parishes suffered much from the disease, contributing in the single fortnight ending 20th April no less than 81 cases to hospital. By June the outbreak commenced to decline, and in August it practically ceased in these parishes. Altogether, from



the beginning of January to the end of August, 368 houses were invaded in Chelsea, Fulham, and Kensington; of these, 211 were in the special area and 157 in other parts of the three parishes. The rates of invasion during this period per 100 houses were 1·80 and ·67 in the special area and in other parts, respectively.

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*Epidemic period, 1878-79.*—In October 1878 small-pox in London commenced again to increase. By January 1879 the total fortnightly admissions to the small-pox hospitals of the Metropolitan Asylums Board had risen from 24 in October to 150. In this January admissions to Fulham Hospital, which in August, September, and October had averaged less than one per week, increased to 15 in a fortnight, most of them from distant parishes. Very soon Chelsea, Fulham, and Kensington began to suffer much from small-pox, and by mid March, when small-pox in London generally had begun to incline, were contributing 20 to 30 cases per fortnight to hospital. In May and June small-pox in the three parishes reached its highest point, and then declined rapidly until in 10 weeks of October, November, and December only one case was received into hospital. In all, from August 1878 to October 1879, 307 houses were invaded in Chelsea, Fulham, and Kensington. Of these 307, 197 were in the special area and 110 in other parts of the three parishes. The rates of invasion during this epidemic period were 1·68 and ·47 on the special area and the other parts respectively.

*Epidemic period, 1880.*—By the end of January 1880 another outbreak of small-pox in London appeared to be in progress. Through February to early March the fortnightly admissions to the small-pox hospitals of the Metropolitan Asylums Board rapidly mounted to 112, and concurrently admissions to Fulham increased. In January and early February these were mainly from distant parishes; thenceforward to the end of March Chelsea, Fulham, and Kensington contributed in excess of other parishes. From the end of March small-pox, which had never been severely prevalent, fell both in London and in the three parishes until May, when there was temporary increase generally. In this and the following month admissions to Fulham Hospital, from an average of four per fortnight, rose to 15, 15, and 19 in three successive fortnights. Mainly this increase was from other parishes, but Chelsea, Fulham, and Kensington participated in it. After June small-pox throughout London declined, until in early October the total admissions to the hospitals of the Metropolitan Asylums District had fallen to 29, and admissions to Fulham to two only in a fortnight. Altogether, from October 1879 to December 1880, the houses invaded in Chelsea, Fulham, and Kensington numbered 92; of these 68 were in the special area and 24 in other parts of the three parishes. The rates of invasion respectively were ·58 and ·10 per 100 houses.

*Commencement of present Epidemic.*—The more recent history of small-pox in London and in Chelsea, Fulham, and Kensington up to 5th February 1881 has already been given. At that date the number of houses invaded in the three parishes amounted to 67. Of these 48 were in the special area and 19 in other parts of the district outside that area. The rates respectively are ·40 and ·08.

The foregoing particulars respecting the incidence of small-pox on the special area and on other parts of Chelsea, Fulham, and Kensington, in different periods since establishment of Fulham Hospital, may be thus summarised, the facts as to 1881 being brought down to a later date:—

APP. NO. 2. **TABLE III.—INCIDENCE of SMALL-POX on HOUSES in CHELSEA, FULHAM, and KENSINGTON during the several epidemic periods subsequent to ESTABLISHMENT of FULHAM HOSPITAL.**

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Epidemic Periods.	Rate per 100 Houses in each Area referred to.		
	Whole of the three Parishes.	The Special Area within One Mile Radius from the Hospital.	Other parts of the Parishes outside Special Area.
March 1877 to January 1878 ...	·94	1·10	·86
January 1878 to September 1878 ...	1·05	1·80	·67
September 1878 to October 1879 ...	·87	1·68	·47
October 1879 to December 1880 ...	·26	·58	·10
December 1880 to 2nd April 1881 ...	·62	1·21	·32

This, then, is the history of small-pox in Chelsea, Fulham, and Kensington in the years during which the Fulham Hospital has been in use. The constant repetition of the same special incidence of the disease on the area immediately surrounding the hospital can hardly be explained by chance, but requires us to believe that, during every one of former epidemic periods, as in the epidemic period now under special investigation, some special factor of small-pox has been in operation within the mile radius, or at all events more within than outside the circle. Never in any period since 1877 has the incidence on this special area been less than twice that on other parts of the three parishes; while in one period, when small-pox was at an exceptionally low ebb in London, the incidence on this particular area was nearly six times that on other parts of the parishes outside the area. Nor is this all. Regarding for the present the entire area of the three parishes, the foregoing narrative will have shown that a special factor of epidemic small-pox in them, whatever it may have been, has on no occasion since 1877 come into operation until small-pox cases from outlying or distant parishes had been transferred to Fulham Hospital. Then only, and as a pretty close sequence to such transference with its attendant circumstances, has small-pox become seriously prevalent in these parishes.

At this stage of the report, certain indications for more minute examination of the facts may be seen; and further inquiry may be made with expectation of more than mere proof or disproof of the result hitherto attained. For if in connexion with a more exact distribution of local small-pox in regard of place, its more precise distribution in regard of time be examined, we may hope that some suggestion as to the significance of the exceptional incidence may be forthcoming.

Proceeding to report the results of more detailed inquiry, I shall again begin with the facts of the recent epidemic outburst, for the reason that the knowledge attainable respecting it is the more complete and accurate, having been got from careful personal inquiry, with abundant assistance from others, while the knowledge of former epidemics has necessarily been derived from records alone; and these



in some respects are imperfect. For the purpose of examining incidence upon smaller localities, I divide my special area into a central circle and outer rings, preferring quarter-mile circle and rings when much nicety is to be had or large figures are to be dealt with, and using a half-mile circle and a half-mile outer ring when these conditions are not to be had. For the purpose of examining distribution in periods of time, I give in tabular form the data of successive fortnights, recalling the previously noted convenience of this plan; and in the text I propose to direct attention to such relation in point of time as may appear between any accession of cases to hospital and any special manifestation of epidemic prevalence in the immediate neighbourhood of the hospital. As before, the number of houses existing in 1880 within the several parts of the special area will be taken as if they all existed for the last five years, and thus the possibility of heightening any contrast will be avoided. The rates given in the tables of the text can be verified, and the direction of localization of the small-pox incidence can be broadly seen, by reference to the tables and reduced maps which follow the report.

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The outburst of small-pox which occurred around the hospital in the fortnight ending February 5, 1881, freshly attacked 0·35 per cent. of the houses situated within a mile of the hospital, attacked 1·62 per cent. of the houses lying within a quarter mile, ·57 per cent. of the houses in the first ring, ·23 per cent. in the second ring, and ·11 per cent. of houses in the farthest of the rings included within the mile circle.

In the next fortnight, that ending on February 19th, while the absolute incidence of small-pox reached only the half of its previous amount, the relative incidence on the four divisions of the mile circle was very closely the same as before; and with singularly little exception (small though the actual figures are) the same relation between distance from hospital and infection of fresh houses is seen by the following table to have been reproduced one fortnight after another.

TABLE IV.—Showing for 1881 the amounts of SMALL-POX received into FULHAM HOSPITAL, fortnight by fortnight, and the extent to which during the successive fortnights HOUSES in the neighbourhood of the HOSPITAL were newly invaded by SMALL-POX.

Small-pox Cases from all Sources received during the Period.				Within One Mile of the Hospital: Houses becoming newly invaded.				The same in Rates per cent. of Houses.					
Acute Cases.	Convalescent Cases.	Fortnight ending		Total such Houses.	Of which situate.				Total.	0- $\frac{1}{2}$ mile circle.	$\frac{1}{2}$ -1 mile ring.	$\frac{1}{2}$ -1 mile ring.	$\frac{3}{4}$ -1 mile ring.
					Under $\frac{1}{2}$ mile from Hospital.	In ring $\frac{1}{2}$ -1 mile from Hospital.	In ring $\frac{1}{2}$ -1 mile from Hospital.	In ring $\frac{3}{4}$ -1 mile from Hospital.					
—	—	11 Dec. 1880	..	—	—	—	—	—	—	—	—	—	—
8	40	25	..	—	—	—	—	—	—	—	—	—	—
24	70	8 Jan. 1881	..	2	—	—	1	1	·01	—	—	·02	·02
48	22	22	..	5	—	1	3	1	·04	—	·02	·07	·02
80	63	5 Feb. "	..	41	7	20	10	4	·35	1·62	·57	·23	·11
67	10	19 "	..	21	2	6	9	4	·18	·46	·17	·21	·11
91	—	5 Mar. "	..	24	—	8	11	5	·20	—	·22	·26	·14
95	—	19 "	..	24	2	11	7	4	·20	·46	·31	·16	·11
102	12	2 April "	..	25	2	8	12	3	·21	·46	·22	·28	·08
515	317	Dec. 80—April 81	..	142	13	54	53	22	1·21	3·00	1·54	1·25	·61

The diminution in absolute amount of small-pox in the fortnight ending February 19 from that of the previous fortnight would appear to have an importance of its own. Forty-one houses had freshly got small-pox cases in them during the earlier period, but only 21 new houses were attacked in the following fortnight. If the spread of small-pox had been from one infected house to another, or if it had been by distribution from the hospital by way of ambulances, visitors, and the like, this minor incidence was hardly to be expected. Later fortnights gave 24 to 25 houses freshly attacked.

In the accompanying map I have shown by blue dots the place of occurrence of cases in Chelsea, Fulham, and Kensington between the 25th December 1880 and 17th January 1881, while red dots indicate residences of persons attacked in the five days 26th to 30th January. There is also shown the route mainly adopted by ambulances during the period 12th to 17th January when sufferers by the outburst must have acquired their infection, as well as the West Brompton railway stations through which during the same period friends of many people must have passed on their way between infected houses and the hospital.

This map shows more than figures and rates for the several divisions of the three parishes can show; and by itself, it goes far, I think, to prove that the distribution around the hospital was notably uniform in one and in another direction, not specially affecting lines of human movement.

This unexpected fact is in harmony with the strange circumstance that has appeared during the present inquiry, that out of 32 persons in the special area suffering by the outburst at the end of January, the attack of 23 appeared to be without any recognizable exposure to infection. In regard to some of the 23 it had been surmised that on one or another occasion of their temporary absences from home they could have come in relation with small-pox carriers of some sort; but as regards not a few such explanation seemed inadmissible, inasmuch as the sufferers denied having stirred from their homes, or having received visitors, parcels, or the like within the period when they must have become infected. Two illustrations will suffice. An unvaccinated infant aged 13 weeks was attacked by small-pox on the 27th and died on the 30th January. For upwards of a month previous to its illness the infant had not been out of the house, and in that period communication of the household with the outside world in ways at all likely to convey infection to the infant was almost absolutely excluded. Again, an invalid lady who had not been out of her house since the previous September, was attacked by small-pox on the 30th January under similar circumstances, where any relation with infected persons or things appeared to be out of the question.

I pass to consider what evidence in the present subject-matter may be afforded by the experience of previous epidemic periods. If it can for a moment be supposed that during the sharp outburst of small-pox around the hospital last January, there had been any agency in operation beyond ordinary human movements, evidence of some like power during former years of the life of the hospital manifestly deserves to be sought for.

The relation of the hospital during the last four years to small-pox in its neighbourhood, so far as it can be learnt from records, is told in the following tables and in the appended maps. Let it be remembered that over the whole period some three-quarters of the cases occurring in the three parishes have found their way to the hospitals of the Metropolitan Asylums Board, and that they come pretty equably from one and other part in proportion to their occurrence; and that since the first year of the hospital operations the admissions to hospital may



MAP. A. (1.)



*Scale 2 Inches to a Mile*

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EPIDEMIC-PERIOD 1880 81.  
(DECEMBER 80-END OF MARCH 81.)

MAP.E.



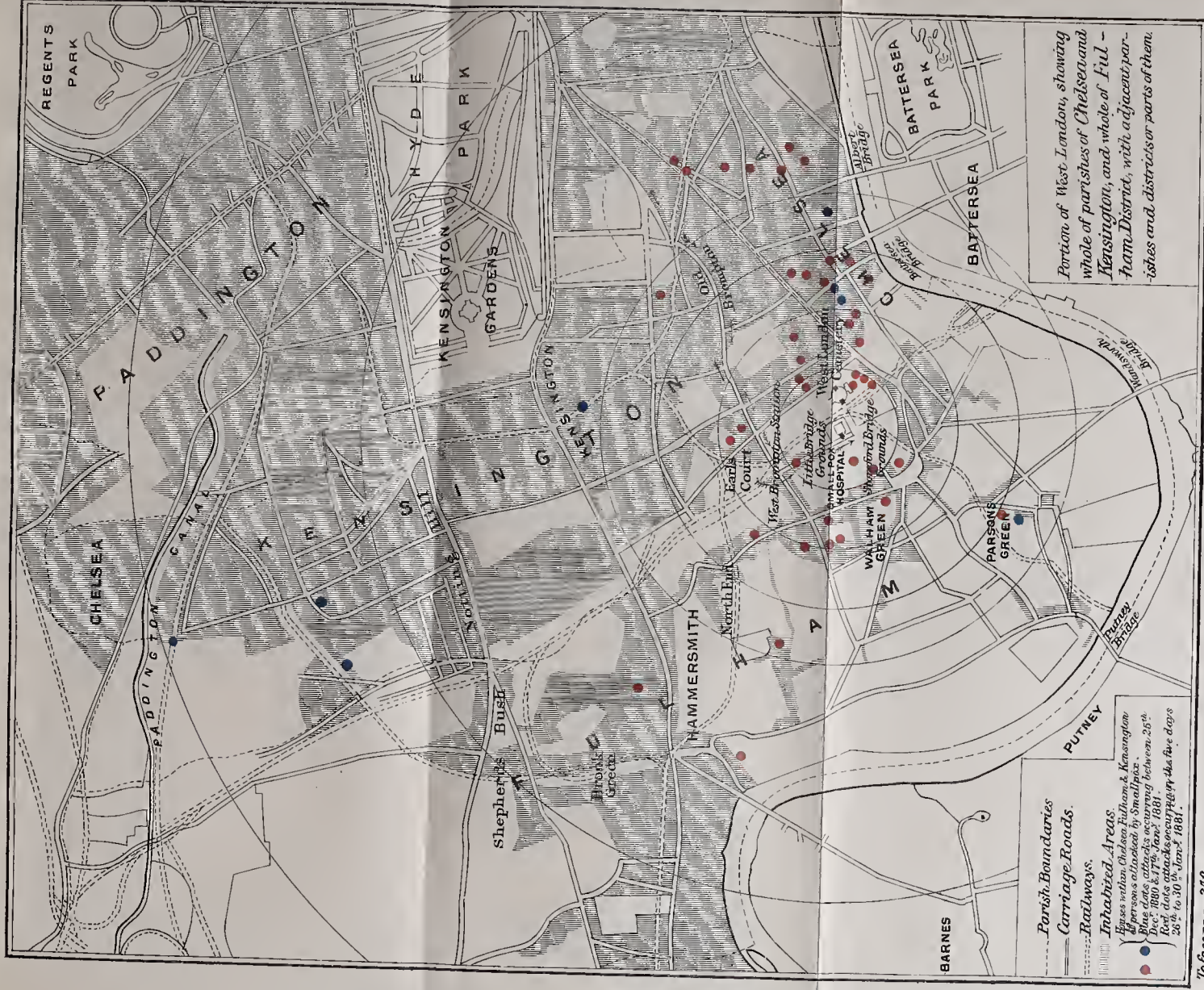
To face page 316.

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EPIDEMIC OUTBURST 1831.  
(JANUARY 26<sup>TH</sup> - 30<sup>TH</sup>)



To face page 318.

Scale 2 Inches to a Mile

The arrows indicate the route chiefly used by the ambulances during the period referred to in the text.

E. Weller & Grahams, Ltd. Litho. London.

(267.5.01)





be securely taken as a measure of the amount and distribution of small-pox in the three parishes.

At the first opening of the hospital on March 10th, 1877, it received a number of convalescents, and its beds were principally occupied by convalescents through April and May. But by June a considerable number of acute cases had been admitted. The occasion for distinguishing between the two classes of cases will presently appear. In the fortnights ending May 26th and June 9th the number of admissions for acute small-pox were 37 and 41 respectively. The hospital now ceased to receive convalescents, and took in 126 more acute cases during June and July, the number of them thenceforward declining.

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TABLE V. (a.)—Showing for 1877 the amounts of SMALL-POX in FULHAM HOSPITAL, fortnight by fortnight, and the extent to which during the successive fortnights HOUSES in the neighbourhood of the HOSPITAL were newly invaded by SMALL-POX.

Small-pox Cases from all Sources received during the Period.		Fortnightly Periods.	Number of Houses invaded.	Within One Mile of the Hospital. Houses becoming newly invaded.	
Acute Cases.	Convalescent Cases.			Rate per 100 Houses in each Area referred to.	
				Under $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ -1 mile from Hospital.
—	—	3 March 1877...	2	—	·02
—	35	17 " " ...	1	·02	—
14	74	31 " " ...	1	—	·01
12	48	14 April .. ...	6	·02	·06
11	14	28 " " ...	6	·10	·02
22	23	12 May " ...	4	·02	·03
37	75	26 " " ...	7	·07	·05
41	20	9 June " ...	6	—	·07
32	—	23 " " ...	8	·15	02
21	—	7 July .. ...	5	·12	—
37	4	21 " " ...	10	·20	·02
36	—	4 August " ...	13	·5	·03
15	—	18 " " ...	7	·07	·05
16	—	1 Sept. " ...	4	·02	·03
10	—	15 " " ...	2	·05	—
14	—	29 " " ...	6	·05	·05
318	293	March 1877-Sept. 1877	88	1·19	·51

Not until early June can the hospital be suspected of distributing small-pox to the district round it, but in the fortnight ending June 23 an exceptional number of houses within half a mile of it became attacked and for several successive fortnights the same thing was seen. It is to be observed that in the fortnight ending May 26th, 37 acute cases travelled from various parts of London to hospital, and remained there without result on the surrounding houses; but the reception of 41 more cases in the next fortnight, that ending June 9th, was followed by this exceptional incidence of small-pox on the near neighbourhood of the hospital as compared with the more distant area.

The hospital was closed to acute cases in October 1877, but small-pox did not completely die out in the three parishes. In November and December convalescents from other hospitals were again brought to Fulham Hospital, and in January 1878 it began again to take in acute

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cases. Small-pox, which now recommenced an epidemic prevalence in London, simultaneously increased in the three parishes, with excess on the special area, while the circle of half-mile radius round the hospital soon suffered in excess of the more distant parts of that area.

TABLE V. (b.)—Showing for 1878 the amounts of SMALL-POX in FULHAM HOSPITAL, fortnight by fortnight, and the extent to which during the successive fortnights HOUSES in the neighbourhood of the HOSPITAL became newly invaded by SMALL-POX.

Small-pox Cases from all Sources received during the Period.		Fortnightly Periods.	Number of Houses invaded.	Within One Mile of the Hospital. Houses becoming newly invaded.	
Acute Cases.	Convalescent Cases.			Rate per 100 Houses in each Area referred to.	
				Under $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ -1 mile from Hospital.
1	*92	12 January 1878	2	—	·02
2	31	26 " "	4	·02	·03
35	41	9 February "	4	·05	·02
39	75	23 " "	8	·07	·06
46	96	9 March "	11	·15	·06
37	29	23 " "	12	·15	·07
76	15	6 April "	20	·22	·14
115	25	20 " "	49	·74	·25
85	—	4 May "	23	·30	·14
89	—	18 " "	26	·38	·14
64	—	1 June "	16	·20	·10
48	—	15 " "	15	·17	·10
36	—	29 " "	10	·10	·07
15	—	13 July "	4	·05	·07
14	—	27 " "	7	·12	·07
10	—	10 August "	—	—	—
2	—	24 " "	—	—	—
71½	404	Jan. 1878-Aug. 1878 ...	211	2·52	1·30

\* 60 of these admitted in November and December 1877.

No sooner had the fortnightly admissions of acute cases reached 35 and 39 in successive periods than the inner circle began to give double the number of cases (rateably to houses) that were contributed by the more distant half-mile ring, and this excess was maintained fortnight by fortnight (with hardly an exception) until the time when the hospital practically suspended its operations. In the history of this period the different relation of acute and convalescent cases to the manifestation of small-pox in the neighbourhood is illustrated afresh.

In the period from September 1878 to the end of the year, the admissions into hospital did not average five per fortnight, and some half-dozen cases only occurred within the circle of a mile radius. But in early January of 1879 the incidence of the disease on this special area became marked, and from this time onwards was steadily in excess upon the nearer houses as compared with the more distant houses of the area, and this continued up to July. There was during this period no question of convalescents, only one batch of 25 was admitted into the hospital, and the speciality of incidence around the hospital had begun to be manifest before these came there. Further, it is noticeable that the excess upon the immediate neighbourhood, beginning by slower degrees



than on former occasions, was experienced when the external relations of the hospital were not numerous, when half-a-dozen to a dozen patients only were admitted from distant parishes in any single fortnight, when the amount of sick in the hospital at a single moment had not risen above 30, and when opportunities of infection by ambulances and the like must have been correspondingly infrequent. The following are the figures for this period.

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TABLE V. (c.)—Showing for 1878-79 the amount of SMALL-POX in FULHAM HOSPITAL, fortnight by fortnight, and the extent to which during the successive fortnights HOUSES in the neighbourhood of the HOSPITAL became newly invaded by SMALL-POX.

Small-pox Cases from all Sources received during the Period.		Fortnightly Periods.	Within One Mile of the Hospital. Houses becoming newly invaded.		
Acute Cases.	Convalescent Cases.		Number of Houses invaded.	Rate per 100 Houses in each Area referred to.	
				Under $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ -1 mile from Hospital.
—	—	21 Sept. 1878 ...	—	—	—
3	—	5 Oct. " ...	1	—	·01
4	—	19 " " ...	—	—	—
6	—	2 Nov. " ...	1	·02	—
4	—	16 " " ...	2	—	·02
10	—	30 " " ...	2	·06	—
10	—	14 Dec. " ..	—	—	—
6	—	28 " " ...	1	—	·01
16	—	11 January 1879 ...	7	·12	·02
15	25	25 " " ...	2	·02	·01
38	—	8 February " ...	7	·10	·03
56	—	22 " " ...	4	·10	—
57	—	8 March " ...	18	·20	·12
51	—	22 " " ...	15	·25	·06
37	—	5 April " ...	15	·22	·07
45	—	19 " " ...	13	·20	·06
55	—	3 May " ...	23	·33	·12
49	—	17 " " ...	13	·15	·08
41	—	31 " " ...	12	·20	·05
51	—	14 June " ...	24	·33	·14
32	2	28 " " ...	11	·15	·06
27	—	12 July " ...	9	·17	·02
19	—	26 " " ...	9	·07	·07
16	—	9 August " ...	—	—	—
19	—	23 " " ...	5	·03	·05
12	—	6 Sept. " ...	3	·05	·01
—	—	20 " " ...	—	—	—
679	27	Sept. 1878-Sept. 1879...	197	2·80	1·10

The subsequent epidemic period of 1879-80 was a time of peculiar interest in the present connexion. Fulham Hospital was not put to much use during the 13 months comprised in this period; no convalescents were received, and in three fortnights only did the admissions of acute small-pox cases exceed 20. Yet, as Table V. (d.) will show, a like excess of incidence on the nearer area was observed during this period as in former years; and while the actual incidence was less, the degree of its excess was the same as in former years, when regard is had to the extent of the hospital operations.

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TABLE V. (*d.*)—Showing for 1879-80 the amounts of SMALL-POX in FULHAM HOSPITAL, fortnight by fortnight, and the extent to which during the successive fortnights HOUSES in the neighbourhood of the HOSPITAL became newly invaded by SMALL-POX.

Small-pox Cases from all Sources received during the Period.		Fortnightly Periods.	Within One Mile of the Hospital. Houses becoming newly invaded.		
Acute Cases.	Convalescent Cases.		Number of Houses invaded.	Rate per 100 Houses in each Area referred to.	
				Under $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ -1 mile from Hospital.
6	—	27 Sept. 1879 ...	—	—	—
3	—	11 Oct. " ...	1	·02	—
5	—	25 " " ...	—	—	—
5	—	2 Nov. " ...	—	—	—
5	—	22 " " ...	—	—	—
3	—	6 Dec. " ...	—	—	—
13	—	20 " " ...	3	·05	·01
13	—	3 January 1880 ...	3	·05	·01
18	—	17 " " ...	3	·07	—
21	—	31 " " ...	7	·10	·03
37	—	14 February " ...	12	·17	·06
25	—	28 " " ...	14	·22	·06
15	—	13 March " ...	8	·15	·01
8	—	27 " " ...	2	·02	·01
4	—	10 April " ...	—	—	—
4	—	24 " " ...	—	—	—
4	—	8 May " ...	—	—	—
15	—	22 " " ...	—	—	—
15	—	5 June " ...	2	·02	·01
19	—	19 " " ...	1	·02	—
6	—	3 July " ...	1	—	·01
9	—	17 " " ...	3	·02	·02
6	—	31 " " ...	2	·05	—
2	—	14 August " ...	—	—	—
261	—	Sept. 1879-Aug. 1880...	62	1·02	·25

It is seen that a fortnightly average of four acute cases admitted in the last months of 1879 was not accompanied by any manifestation of small-pox around the hospital, but when the admissions rose to 13 in a fortnight, followed by 13, 18, 21 in successive fortnights, small-pox at once appeared in the one-mile area, falling with a special weight on the parts nearest to the hospital, and attacking more and more new houses as cases accumulated at the centre. And this further circumstance appears. At once—upon decline of admissions to a lower average, and before the accumulation of convalescent patients had had time to disperse—small-pox ceases to attack any fresh houses in the neighbourhood and leaves them free during eight successive weeks; and then, following a fresh increase of admissions for acute small-pox, a fresh recurrence of small-pox affects the houses of the special area. This recurrence, small though it is, may not, in view of the incidence of small-pox just previously suffered by the neighbourhood, be regarded as unworthy of notice. It will be observed to have affected the parts of the mile area nearest the hospital three times more heavily than other parts.

I have now to combine the evidence of the above tables into one table, where the more precise distribution of small-pox on the areas around the



hospital will be shown, but where the element of time can only be introduced in a broad and general way.

The table (VI.) shows successive epidemic periods for comparison the one with the other. In this connexion I would refer to the maps which accompany this report. They are (like the one relating to 1881 in the text) reductions from larger maps, in which every invaded house has been noted. The reduced maps will not tell the whole story of incidence upon houses near the hospital as compared with more distant ones, since the number of houses cannot be indicated. But this point has been sufficiently brought out in the figures of the various tables. And they will suffice, I think, to show, what was still more obvious on the original maps, that in proportion as, at any given distance from the hospital, there were houses to be affected, the houses became affected by small-pox no matter what their *direction* from the hospital; that, indeed, such difference as there was among them was not by way of excess on the Brompton Road direction that was principally used by ambulances and visitors, but was an excess on the direction towards the river, which would be comparatively little frequented by persons coming to and going from the hospital.

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TABLE VI.—ADMISSIONS of ACUTE SMALL-POX to FULHAM HOSPITAL, and INCIDENCE of SMALL-POX upon Houses in several divisions of the SPECIAL AREA, during five epidemic periods.

Cases of acute Small-pox admitted.	In Epidemic Periods since opening of Hospital.	Incidence on every Hundred Houses within the Special Area and its Divisions.				
		On total Special Area.	On small Circle, 0- $\frac{1}{4}$ mile.	On first Ring, $\frac{1}{4}$ - $\frac{1}{2}$ mile.	On second Ring, $\frac{1}{2}$ - $\frac{3}{4}$ mile.	On third Ring, $\frac{3}{4}$ -1 mile.
327	March 77-end 77 ...	1.10	3.47	1.37	1.27	.36
714	Jan. 78-Sept. 78 ...	1.80	4.62	2.55	1.84	.67
679	Sept. 78-Oct. 79 ...	1.68	4.40	2.63	1.49	.64
292	Oct. 79-Dec. 80 ...	.58	1.85	1.06	.30	.28
515	Dec. 80-2 Apr. 81 ...	1.21	3.00	1.54	1.25	.61
2,527	Five periods... ...	6.37	17.35	9.20	6.16	2.57

The experience of former years, then, so far as can be judged by records now available, proves, at each successive step of its examination, to be in complete accord with the more carefully investigated experience of the year 1881. The relation in point of time between, on the one hand, a moderate amount of cases of acute small-pox brought into the hospital from a distance, and, on the other hand, the appearance of small-pox in the houses surrounding the hospital, turns out to be in no wise peculiar to the present year; while the graduated intensity of the local small-pox manifestation, according to distance from the hospital, is strikingly apparent for every period of the hospital operations.

Not in one outbreak only, nor merely at rare intervals, but year by year since establishment of Fulham Hospital, the several sections into which the special area has been divided have suffered an incidence of small-pox varying with the closeness of their relation to the hospital. The small circle containing the hospital, and having but few dwellings a quarter of a mile distant therefrom, has suffered in such dwellings as it contains much in excess of the more distant first ring; and similarly, the first ring has suffered in excess of the second ring, and the second

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ring in excess of the third. So that for the whole period there is something like a doubling of small-pox incidence, section by section, progressively from the circumference of the special area towards its centre, where the small circular section containing the hospital is seen to have suffered an incidence approaching to eight times that of the third or outer ring. And this is not all; for, given a particular epidemic with a certain degree of small-pox incidence on the whole special area, with related gradations of incidence on the several sub-areas, it will be found that another epidemic with the double or half of this degree of incidence on the whole area results in an almost exact doubling or halving of the several gradations of incidence upon the several parts of the area. Finally, it is strikingly apparent that the degree of small-pox incidence on the whole special area with the related gradations of incidence on the several sub-areas has again and again since the initiatory epidemic of 1877 been singularly exactly proportioned to the operations of the hospital as measured by the admissions thereto of acute small-pox cases.

It will now be convenient to sum up the results that have, up to this point, been established in the present inquiry.

1. There has been in each epidemic period an excessive incidence of small-pox on houses in the neighbourhood of the hospital as compared with more distant houses in Chelsea, Fulham, and Kensington.

2. The percentage of houses invaded in the neighbourhood of the hospital has become gradually smaller as the distance of the houses from the hospital has increased.

This gradation has been very exact and very constant.

3. Houses upon the chief lines of human intercourse with the hospital have not suffered more than houses lying in other directions from the hospital.

4. In point of time, there has been a very marked relation between the varying use of the hospital and the manifestations of excessive small-pox in the neighbourhood.

This relation has not shown itself while the use of the hospital has been for convalescents only.

5. The appearance of excessive small-pox in houses around the hospital has never been delayed until the hospital has become full or nearly full. It has always been most remarkable at the time when admissions to the hospital were beginning to increase rapidly.

In the succeeding months of active operations, though the use of the hospital may have gone on increasing, the excess of small-pox upon the neighbourhood has habitually become less marked.

6. On comparison of different epidemics, an almost constant ratio is observed between the amount of the hospital operations and the degree of excess of small-pox on the neighbourhood.

The point now reached in this report will deserve to be kept in view in proceeding to the next subjects of study; namely, the administrative circumstances of the hospital, and the sufficiency of these to account for the observed results.

At the time of the opening of Fulham Hospital, four years ago, the Managers of the Metropolitan Asylums Board were nowise unfamiliar with the accusations to which small-pox hospitals are liable, and they applied their experience with great intelligence and forethought. The hospital buildings are, as has been shown, thoroughly well enclosed and separated from populous parts of the district by wide intervals of open ground. Also, they are remote from traffic routes, so that few persons besides those having business at the hospital need to go near it.



The possibility of the sewerage or water service of the hospital having been concerned in the extension of disease from it has been considered, only to be set aside.

The current doings of the hospital have been from the first regulated with the express purpose of avoiding all needless communication with the outside. The following account of these doings, though based on the experience of the present year, gives a fair picture of the life of the hospital during the whole period since its establishment. The narrative is told below under various headings, according as one or another danger from the hospital may be supposed to be incurred.

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*Small-pox patients in Hospital.*—Patients are deposited by ambulance at the door of the “receiving room,” where they take leave of any friends who may have accompanied them, and are at once placed in their proper wards. Each patient, upon being placed in his ward, is stripped and supplied with clothes provided by the hospital. His own clothing is washed in the hospital laundry, and is further disinfected by dry heat. It is then lodged in a special store until, on his recovery, it is returned to him in the “receiving” room after he has there undergone a final course of bathing and disinfection immediately before his discharge. During the patient’s stay in the hospital, if he goes on well there is no communication allowed, except by letter, between himself and his friends, up to the time of his discharge. All letters before they are despatched from the hospital are subjected to a process of disinfection. Relations are only allowed to visit small-pox cases when there is risk of the patient’s life, and then only under restrictions. They have to put on a special dress, so made as to entirely envelope the person of the visitor during his short visit to the ward.

*Permanent and temporary staff of the Hospital.*—Attendants on the sick are subject to very particular regulations. Nurses, assistant nurses, and ward servants are not under any circumstances permitted to leave the hospital without a special pass, which can only take effect when the person to whom it applies has changed her hospital uniform for a private dress that has been kept in a building altogether separate from the ward in which she serves. Similar precautions are enforced in regard to all other officers, male and female. The medical officers, the steward, and the matron are charged with the administration of the regulations referred to. They themselves are not indeed under regulation in such matters, but they are expected to observe the same kind of precaution, and in fact they do so. Besides the resident staff there are five persons, a store’s porter, a gardener, a carpenter, a stoker, and a steward’s clerk, permanently employed at the hospital but residing elsewhere; and there are in addition painters, bricklayers, and such people employed from time to time as occasion may require. None of this last class of persons come into personal relation with patients actually suffering from small-pox, and to them, therefore, the above regulations have not been applied. All are, however, required to be revaccinated.

*Regular and occasional Visitors to the Hospital.*—Among regular visitors are numerous tradesmen, some of whom attend at the hospital daily, others less frequently though at regular intervals. All tradespeople enter the hospital gates and passing between the northern series of pavilions and the administrative block, drive round to the back of the latter, where are situated the steward’s offices and stores. None of the tradesmen have necessarily communication with patients or with actual attendants on the sick, though they may be in occasional relation with persons of the latter class who are frequently passing backwards and forwards between the wards and the steward’s office. No doubt there



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is a certain risk of contagion to those tradesmen under the arrangements described, but it is extremely doubtful whether the risk is anything more than a personal one in each instance. None are known to have conveyed small-pox infection to their homes without themselves suffering from the disease. Arrangements are now being made for the erection of a storehouse near the gate lodge, so that there may in future be no necessity for tradesmen entering within the lines of the hospital pavilions. Of all persons having business relations with the hospital the "dustmen" would appear subject to greatest risk, personal and other. Dustmen do not actually enter the wards, yet they come during their work about the ward offices in contact with the ward attendants, and in addition they get by their occupation plentifully besprinkled with certain refuse of the wards. The latter is, however, less dangerous than might be supposed. It should consist of culinary and ash refuse alone; for all ward sweepings, refuse dressings of patients, poultices and the like are by special regulation separately collected daily and burned in the hospital furnace by hospital servants.

Tradesmen having business at the hospital are all advised to be re-vaccinated. Those who have taken this advice have escaped, but those who have not done so appear to run an appreciable risk. Two persons coming within the latter category have taken small pox this year; a third tradesman who fell ill of small-pox had not had business there at such time that his attack could with any certainty be ascribed to his visits. But one of the two tradesmen attacked is a case of considerable interest, and deserves to be stated at length. He was a dustman (foreman) employed by the Fulham Board of Works, and his duty took him to the hospital once a fortnight. He was attacked by small-pox on the 6th February, 13 days after his last visit to the hospital; neither he nor his mates having been there during the period 12-17 January. This man's case is interesting as showing that a person plentifully besmirched with refuse from a small-pox ward is not necessarily a ready carrier of infection. For, notwithstanding his business at this hospital during several years, this dustman did not cause any mischief at his own home until he himself was attacked; then he quickly infected his unvaccinated son aged 7, another of his sons, and a lodger. Now, this man lived near the boundary of my special area, nearly a mile from the hospital, and can hardly be supposed to have got rid of infective matter, if such matter had simply attached itself to his person, any more than he had got rid of his more visible dust and dirt, before reaching his home. But nevertheless, until he succeeded in getting such infection at the hospital as sufficed to give disease to himself personally, he did not carry with him into this susceptible family of his any valid infection from the hospital. The case is altogether a noteworthy one.

Occasional visitors to the hospital comprise members of the Hospital Committee, the Chaplain, friends of officers, and Inspectors of the Local Government Board, but none of these persons visit the hospital with such frequency or regularity to deserve consideration here.

Other risks of spread of infection less immediately connected with the hospital though necessarily incidental to its presence are: conveyance of patients to hospital, and journeying backwards and forwards of persons (many of them from infected dwellings) in quest of information respecting their friends under treatment in hospital. *Convalescent patients* from other hospitals are transferred to Fulham in ambulances belonging to and regulated by the Metropolitan Asylums Board. *Acute cases* are conveyed in ambulances over which that Board has no control while they are outside the limits of the hospital premises. These other ambulances belong in each instance to the Poor Law Authority of the district in which the patient to be removed has been resident at the date of his attack; and, as might be anticipated, such ambulances are very variously regulated or are even without adequate regulation. Many are horsed and driven by persons contracting with the particular Poor Law



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Authority. Others, however they may be horsed, are driven by paupers. Some carry with them a nurse in charge of the patient; others have no nurses, but take with them friends of the patient. Complaints have been numerous of ambulances stopping outside public-houses while their attendants refreshed themselves within. Complaints of this sort have not referred to Metropolitan Asylums Board ambulances, and in regard of others, they have mainly concerned vehicles returning from hospital after deposit there of their freight, and subsequently, therefore, to the disinfection by chlorine which is undergone by every ambulance before it is permitted to leave the hospital premises. Nevertheless there may be real danger from these halting ambulances, not only to persons in public-houses who come in contact with the ambulance attendants, but to children and other curious persons who are sure to collect for investigation of the temporarily deserted vehicle. There is less excuse at the present time for irregularities of the above sort, since the hospital authorities supply refreshment to ambulance attendants desiring it.—As regards *friends calling* at the hospital for news of patients under treatment, their number has relation to the growth of cases in hospital, and becomes at times very great. But with the exception of the very few actual relatives admitted to visit patients dangerously ill, no callers enter the hospital grounds. Their inquiries are replied to by the gate porter, who is supplied daily with a list of patients seriously ill. Callers are believed by the gate porter to comprise a good many idle and curious persons who having time on their hands spend some of it in inquiring as to the progress of their mates and acquaintances. The number daily of these "callers" is not recorded, but it may be regarded as including a good many persons besides those who come from actually infected dwellings. This last class of callers must, however, at times become numerous, and they deserve to be fully taken into account as an element in the total of hospital influences.

I pass to consider what agencies of the foregoing nature can have been special to the particular epidemic spread observed in January of the present year. On January 17th, when I began this inquiry, I found that the hospital had received since its opening in December 165 patients, of these 110 had been admitted as convalescents and 55 as acute cases. So far only five cases had been admitted from Chelsea, Fulham, and Kensington, and of these but two had come from the special area. At the same date the resident staff of the hospital comprised 48 persons—a medical officer, a steward, a matron, 23 nurses, assistant nurses, and ward maids, and 22 house servants, porters, engineers, laundryhands, &c. The non-resident staff consisted of the persons already referred to, and in addition there were six painters employed about the unoccupied pavilions.

As soon as the special character of the outburst of January 26th-30th was observed, and it was seen to be necessarily related to the circumstances of the patients during the days January 12th-17th, attempt was made to estimate the various kinds of influence that the hospital could have exerted during that particular period of (it will be convenient to say) six days. Consideration was given to the comings and goings of all the above persons, to attendance of tradesmen, and of other regular and occasional visitors to the hospital. The following list has reference to outgoings only; outgoings of non-residents of course implying their coming to the hospital. Note has also been made of the number of ambulance journeys and of visitors to patients. Of these, the coming from infected houses is of importance, as well as the leaving the hospital. The total numbers for the six days were closely as follows:—

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Leave-passes for two to four hours, granted to 48 persons					
of the resident staff	-	-	-	-	103
Errand-passes to porters	-	-	-	-	28
Outgoings of non-resident persons:—					
„ non-resident staff	-	-	-	-	48
„ painters	-	-	-	-	72
„ tradespeople	-	-	-	about	45
„ superior officers and their visitors	-	-	-	about	24
Comings and goings (together counted as one)—					
„ of ambulances	-	-	-	-	18
„ of visitors to patients in wards	-	-	-	-	13
„ of callers at gate:—					
callers about dangerous cases	-	-	-	-	16
„ about patients recovering				about	72
Total -					439

Some 70 occasions, day by day, of communication between the hospital and the district around it, seem to suggest many opportunities for spread of infection. Indeed, so frequent in the particular period have been the communications, and so numerous the agents thereof, that, if these agents or many of them could be believed to have been at that time capable of acting as carriers of infection, explanation of some subsequent outburst of small-pox might not be far to seek. But it has been shown that many of the people leaving the hospital have had very insignificant opportunity of carrying infection with them. Probably not more than one in six or one in eight of the above-mentioned occasions of communication between the hospital and the outside is worth consideration. The outgoings of the *resident staff* were almost wholly for visiting friends at a distance, for the committee avoids appointing officers and servants from among the residents in the neighbourhood of the hospital. In the inquiry, no case came to light of any house or person visited by officers or servants of the hospital having become infected with small-pox, and I can hardly suppose that such cases, if they had occurred, would not have been heard of. It is therefore unlikely that the officers and servants can have done much harm in the course of their journeys to and fro. Neither do porters going on various errands, but principally with “disinfected” letters to the post office at the north end of Seagrave Road, appear likely to have carried much infection with them. *Non-resident members* of the staff and the painters deserve more detailed notice. These 11 persons all resided within a mile of the hospital, and all but two returned to their homes to meals. It is true that while at the hospital they did not come into actual relation with acute small-pox; nevertheless they spent their days there, and had communication with attendants on the sick, and could perhaps mingle with persons convalescent from small-pox, who were permitted to walk in the grounds of the hospital. They may very possibly, therefore, have been on occasion carriers of infection. That none of these 11 persons suffered from small-pox is nothing, seeing that they had all been vaccinated and re-vaccinated; but that they did not any of them convey the disease to their homes or lodgings, situated in nine different streets or places around the hospital, is significant, and seems to show that persons having the described degree of relation to the hospital cannot be regarded as having done mischief. Probably they had little concern in the special outburst, since two only of the sufferers by it resided in streets in which persons of this class dwelt. The same thing may be said of tradesmen, in regard



to their possible influence in the special outburst. At the end of January no cases of small-pox were found among the families of tradesmen who had had business at the hospital between the 12th and 17th of the month. There was no suggestion that committee-men and superior officers of the hospital had carried small-pox with them.

There remains to be considered the influence of *ambulances, visitors to patients, and other persons* coming and going between infected dwellings and the hospital. All these must be regarded as very possible carriers of infection, and their total number during the period in question may be thought of as having perhaps sufficed to produce the outburst under consideration. All *ambulances*, except two, arriving at the hospital during the days when the chief spread of infection took place, had come from parishes east and north-east of the hospital, and consequently had in their journeys to and from the hospital kept pretty much to a single route through the special area; namely, by way of Brompton, Richmond, and Seagrave Roads, *the part, namely, of the particular area that suffered least in the outburst* at the end of January; and it is further to be observed that the comings and goings of these vehicles were not more numerous during the six days under review than they had been in other similar periods since the opening of the hospital in December. While fully admitting that any mischief which ambulances might have been able to effect would not have been confined to residents in streets or places through which they passed, yet it would assuredly be imputing too much to the agency (direct or indirect) of these vehicles to conceive of them as causing small-pox in 20 or 30 houses in a variety of directions away from their line of route, while they did not distribute even the same relative amount of small-pox along the route itself. Nor can the fact (learned by very exact inquiry) be set aside, that out of all the persons attacked in the special outburst of January, one only had had any relation with ambulances or ambulance drivers; and in the case of this individual there had been other opportunity for receiving infection. As respects *visitors to patients*, it may be noted that before the outbreak the actual visitors were few and none of them from the neighbourhood; and not a single person of those who visited their relatives in hospital in the previous fortnight was admitted as a patient during the principal outbreak of the disease. *Other callers* (people who did not pass the gates) were no doubt more numerous, and some of them were from infected dwellings; no statement can be made as to any power for harm they may possibly have had.

This has been the recent history of the administrative relations of the hospital, so far as concerns the possible distribution, by their agency, of infection to the neighbourhood of the hospital. As I have before said, the recent experiences may be regarded as fairly representing the previous influence of like agencies since the opening of the hospital. And now arises the question which would appear to be all important for the practical purposes of the present inquiry: How far are we justified in regarding the aggregate of the foregoing relations as sufficient to account for the special manifestations of small-pox around the hospital? or, How far is it necessary to invoke as required for the production of the observed results some hitherto unrecognised conditions pertaining to the hospital?

The recognised communications of the establishment with the outer world, along with various known and suspected errors and oversights, do, out of doubt, combine into a considerable sum of influence that may have been exerted by the hospital upon its neighbourhood, and that must, whatever their amount, have been necessarily more intense in the nearest vicinity of the establishment. But to say that the hospital

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influence has been nothing but this, would not be justified, unless we could affirm the adequacy of such conditions to the production of the observed results: nor indeed would it be wholly justified unless we had proof of the absence of other conditions that might be adequate to the results.

Upon review, however, of all the facts above recorded under the name of administrative circumstances of the hospital, inclusive of all probable errors and defects in those circumstances, I am constrained to speak of them as insufficient to explain the demonstrated influence of the hospital upon the district surrounding it. Neither of the facts of the particular outburst of last January, nor the phenomena of small-pox in the three parishes during successive epidemic periods since the hospital was first used, appear capable of explanation in such way. And upon turning to face the question, whether in the history of the hospital, there is anything tending to disprove the operation of other conditions, it would seem impossible to doubt what the answer must be. We have, in the exactly repeated experiences of each year, indications of a method of small-pox extension to the hospital neighbourhood, altogether differing from any ascribed to this disease by current medical authority, but bearing in its results a resemblance to the operation of some natural law.

It becomes necessary therefore to formulate, as a further and to me unexpected result of the present inquiry, the following additional propositions:—

7. The machinery of the hospital administration, with inclusion of defects in that machinery, does not account for the peculiarity of small-pox incidence within the three parishes of Chelsea, Fulham, and Kensington since the establishment of the hospital.

8. There must have been some condition or conditions operating to produce the observed distribution of small-pox around the hospital that have pertained to the hospital as such and that have been in excess of the condition of small-pox extension as usually recognised.

To these propositions it should be seen to be a corollary; that every detail in the machinery of the hospital that is within the province of hospital administration becomes of more importance to the protection of the neighbourhood than ever before. The apprehension that, outside of conditions over which man has control, there may exist other conditions conducing to the spread of small-pox from a hospital to its neighbourhood should be a reason for increased and not for diminished watchfulness in the management of the hospital, in order that such other conditions may be deprived, as far as human foresight can deprive them, of the opportunity of exerting their influence.

Before passing to the consideration of the conditions that may have acted in the production of small-pox around the hospital, I ought to mention the reluctance with which I have been forced to the conclusions which I have just stated, and to say that it was not until this reluctance had been overcome by the cogency of the observed facts that I ventured on any thought of what might be the nature of the conditions requisite to account for the ascertained phenomena of distribution. Even now, what I have to add to the foregoing portions of my report will be concerned less with any question of essential intensification of small-pox than with the *means* by which small-pox in hospital can have extended itself otherwise than by hitherto admitted agencies, beyond the hospital to its neighbourhood; for I would avoid, so far as possible, introducing into this report anything needlessly speculative in character.

Having regard to the singular facility which small-pox has to spread



to a distant part of a large hospital under circumstances that almost forbid belief in infection conveyance by personal means, and seeing, further, how some popular opinion has suggested a hypothesis of *direct atmospheric agency* as the means whereby small-pox communicates its infection to even distant places, I have thought right to examine the distribution of small-pox around Fulham Hospital from this point of view; and I have found some indications, growing as the examination has progressed, that such a hypothesis helps, in an important measure, to an understanding of the method by which small-pox has spread to the neighbourhood.

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It has been necessarily in the experiences of the present epidemic-period, as being the only one for which exact data are forthcoming, that I have sought for evidence regarding this hypothesis of the method of infection distribution. The outburst of last January, with its well-marked incidences, especially has claimed to be regarded from this fresh view-point. In the way now suggested, more readily than otherwise, has it seemed possible to explain the various specialities of this outburst. That delay in extension, that indifference to direction of spread, and that lack of discoverable infection-conveyance that gave to the outburst its peculiar characters, would appear all to become more intelligible when atmospheric conditions of one and another sort are brought into the account.

With such a hypothesis, equally as with a hypothesis of conveyance by human movements, would the gradation of hospital influence from centre to periphery be in complete accord, and so would be the fact that the influence became after a while a waning influence; it must have been so through the very efficiency of the agency, whatever the agency were.

But the further circumstance of the January epidemic spread, which constitutes its most remarkable feature, namely, the sudden and simultaneous attack of a considerable proportion of susceptible people living around the hospital, and having had no discernible relations with the hospital or with each other; the circumstance, as now learned, appears hardly intelligible without some hypothesis of conveyance of infection through the atmosphere; and seems at the same time to require some exceptional conditions of atmosphere for its explanation. Any speciality in the meteorology of the particular days when small-pox spread itself most intensely around the hospital, has come therefore to deserve careful consideration.

As regards the *conditions of atmosphere* external to the hospital that may have been related first to the non-dissemination and subsequently to the observed dissemination of small-pox around the hospital; it cannot in the present state of our knowledge be affirmed that during the period of delay in dissemination the weather-circumstances were such as to account for the delay; but it may be said that during the period when infection did spread, these circumstances were certainly of a nature to have assisted in the dissemination.

I here use the word "dissemination" in preference to "diffusion," wishing to comprise in the adopted word the spreading abroad of particulate, and not only of aëriiform, matter; and I choose "dissemination" in preference to "dispersion," wishing to signify, not a mere getting rid of the matter, but such distribution of the matter as shall be consistent with more or less retention of such qualities as it may be endowed with. In this connexion, it deserves to be once more recalled that, among matters of its class, the small-pox contagion is distinguished by its small liability to destruction through the action of air upon it.

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Familiar illustration of that conveyance of particulate matter which I am here including in the term "dissemination" is seen summer and winter in the movement of particles forming mist and fog. The chief of these are of course water particles; but these carry gently about with them, in an unaltered form, other matters that have been suspended in the atmosphere and these other suspended matters, during the almost absolute stillness attending the formation of dew and hoar frost, sink earthwards, and may often be recognised after their deposit. As to the capacity of fogs to this end no Londoner needs instructions; and few persons can have failed to notice the immense distances that scent of flowers, of hayfields, of the sea, as well as other and less pleasing odours, can travel on the "air-breaths" of a still summer's night. And there are considerations that require us to believe particulate matter to be more easy of suspension in an unchanged form during any remarkable calmness of atmosphere. Even quite conspicuous objects, such as cobwebs, may be held up in the air under such conditions. Probably there are few observant persons of rural habits who cannot call to mind one or another still autumn morning, when, from a cloudless though perhaps hazy sky, they have noted over a wide area steady descent of countless spider-webs, many of them well nigh perfect in all details of their construction.

Referring now to the Greenwich Meteorological Observations, published in the Registrar-General's Weekly Returns of Births and Deaths, and quoted in tables annexed to this report, it will be found that in the last week of December 1880 and first 10 days of January 1881 the weather was first mild or unsettled, and gradually became colder. In the last week of the old year the mean daily temperature averaged 40·6; in the following week 38·4. Throughout this period winds were steady, at first from S. to W., and afterwards to 11th January from N. to E. With the new year the barometer, which a few days previously had been barely above 29, attained 30 inches, and remained at 30 or even higher until 11th January, when a rapidly-increasing fall was manifest. On the 12th of the month began a period of severe frost, characterised by still, sometimes foggy weather, with occasional light airs from nearly all points of the compass. These conditions continued with scarcely any variation until the 18th of January, when there occurred a notable snow fall, accompanied by a heavy gale from E.N.E.

In the days, then, of chief distribution of small-pox around Fulham Hospital, there existed over the neighbourhood of the hospital opportunities of a remarkable kind, not for removal of matters contained in the air, but for the quiet dissemination of matters contained in the air, and for the deposit, perhaps, of any that were particulate. While the incidence of small-pox upon houses coincident with this distribution of aërially-contained matters was almost the same in all directions from the hospital as a centre, the intensity of the incidence (measured by the percentage of houses invaded) was proportioned to the nearness of the houses to the hospital. In these particular days, too, an increasing number of acute cases of small-pox, being received at the hospital, was charging the air of the hospital with abundance of infection in an active state.\*

In view of the whole case I find it impossible to regard these circum-

\* The material of many contagious diseases is not, we know, injured by frost. There is no reason to suppose that frost can injure the contagion of small-pox.



stances excepting as standing to each other in the relation of effect to cause. APP. No. 2.

Objection may perhaps be taken that the meteorological records of Greenwich do not correctly represent the circumstances of Fulham; but there is good ground for believing that at the period in question there was no great difference in the meteorological circumstances of the two places; and indeed there exists at both places alike a special condition that may make Greenwich a particularly good representative of Fulham in its meteorology. It is a condition important to the gentle distribution of aërially suspended matters. Fulham, like Greenwich, is on the bank of a tidal river, and Fulham Small-pox Hospital is placed at the base of a looped formed by the Thames in its course from Hammersmith to Chelsea. Local air currents set in motion during still weather by ebb and flow of the tide, provide perfectly well for the gentle wafting to and fro, across the district in which the hospital is placed, of any particulate matter borne from the hospital by the air.

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Another meteorological circumstance, perhaps, deserves notice. We know too little of the action of *ozone* upon infections to justify much of positive inference from its presence or absence. But it may be recorded that, for four days, up to and inclusive of 8th January, ozone was present in the atmosphere in even more than its usual amount. Thenceforward, for eight days, it was altogether absent; on the 17th January it reappeared, and on the next day, 18th January, was once more abundant. From early December until the end of March there was no similar period of entire absence of ozone from the atmosphere. Ozone was present therefore just before, was absent during, and it reappeared at the end of the period in which sufferers by the outburst of small-pox became infected. The fact may be not without significance. It were to be wished that examination of the previous meteorology could be made for past epidemic periods, but this cannot be done with any precision; and it must suffice to say that periods resembling in their meteorology (especially in the small movement of air and the absence of ozone) may be found in front of each of the more notable epidemic extensions of small-pox in the neighbourhood round the hospital.

As further result, therefore, of the present inquiry, it would appear that—

9. During the present epidemic period, and most probably during former similar periods, there has arisen in the atmospheric circumstances of the time, peculiar facility for the dissemination in an undamaged state of any matter that may have been given off from the hospital.

As regards the further question: What may be the ultimate nature of the condition above spoken of as pertaining to the hospital that has enabled the hospital to disseminate small-pox around it in a way that small-pox is not distributed from private houses, there will have appeared in the course of this report many considerations having interest and probable importance. Such are the quantity of small-pox cases receivable into hospital before influence upon its neighbourhood has, under one and another set of collateral circumstances, become manifest; and the strong distinction between convalescents and acute cases in their ability to give rise to evidences of small-pox around the hospital. But to discuss these matters would lead me into too large and too speculative questions of the pathology of contagion; and I scarcely venture to touch the outmost fringe of that general subject.

Yet it will inevitably be asked whether the difference between Fulham Hospital and the private houses of the district in their ability to distribute small-pox to neighbours, is mere matter of concentration and demonstrability: as a large fire would scorch at a greater distance than a small one, and would be more seen and talked of than many small

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fires would be? No doubt, if all the coals of a hundred kitchen fires were set blazing in one fire the heat would extend to a noticeable degree for a considerable distance, and everybody would know of it; whereas the heat of a hundred actual kitchen fires is not known about, and is only inferred from some effects not easily demonstrable to have the fires for their cause. Is a difference of this kind the only difference between a hundred cases of small-pox in Fulham Hospital and the same hundred cases left in the houses of London, and doing there unobserved, perhaps their greater, mischief there?

Or, it will further be asked, is the factor operating to produce the demonstrated excess of small-pox in the neighbourhood of this hospital, a wholly different affair: a something, for instance, that requires for our belief in it that it has a different quality, intensity, potency, from anything that belongs to small-pox in its several nests of origin? Does it consist of an alteration in the quality of the small-pox material, an exalted faculty of reproducing its kind? And is this development of the life of small-pox attributable to the bringing together of many differing, while actively endowed, varieties of the disease; in the same fashion that longer stamened primroses and shorter stamened primroses, flowers of the same species, propagate better than primroses which all have the same relation of stamen to ovary?

I cannot answer these questions; but I have during my inquiry obtained a suspicion that the latter may hereafter be found to be the truer solution.

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## METROPOLITAN ASYLUMS DISTRICT.—FEVER AND SMALL-POX HOSPITALS.

### RULES REGULATING THE VISITING OF PATIENTS.

I.—The visiting of patients in these hospitals is limited to the nearest relatives and intimate friends of patients dangerously ill. One visitor will be allowed daily to each of such patients. Such visits can only be made with the permission of the Medical Superintendent, and will be limited in duration to a quarter of an hour, except in very urgent cases, when two visitors will be allowed, and the duration of the visits may be extended.

II.—Notice will be sent to the nearest known relatives or intimate friends of patients dangerously ill, with an intimation that they may be visited. Such notice will be accompanied by a copy of the regulations under which visits can be made.

III.—A list of patients dangerously ill will be sent daily at 1 o'clock by the Medical Superintendent to the gate porter, to enable him to answer inquiries.

IV.—Visitors are warned that they run great risk in entering the hospitals. No one should attempt to enter the wards of the Small-pox Hospital without having been previously properly re-vaccinated, and if he lives in the house where small-pox has occurred, he is urged to apply at once to the public vaccinator (whose address can be obtained from any of the parish officers) in order that the remainder of the occupiers of such house may be vaccinated.

V.—Visitors are advised—

- (a.) Not to enter any of the wards when in a weak state of health, or in an exhausted condition.
- (b.) To partake of food before entering the hospitals.
- (c.) To avoid touching the patient, or exposing themselves to his breath, or to the emanations from his skin.
- (d.) To sit on a chair at the bedside, at some little distance from the patient, and not to handle the bedclothes.



VI.—Visitors will be required to wear a wrapper (which will be provided at the hospital) to cover their dress when in the wards, and to wash their hands and face with carbolic soap and water before leaving the hospital, or to use some other mode of disinfection, at the discretion of the Medical Superintendent.

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VII.—Visitors are strongly urged not to enter any omnibus, tram-car, or other public conveyance immediately after leaving the hospitals.

BY ORDER OF THE MANAGERS.

15th December 1877.

## FULHAM HOSPITAL.

PARTICULARS SUPPLIED by the STEWARD of the HOSPITAL respecting the WARDS.

*Length of Wards.*—Five on the male side, each measuring 144 feet ; on the female side, other five, each measuring 133 ft. 4 ins.

*Width of all Wards.*—25 ft. 6 ins.

*Height of all Wards to Wall Plate.*—13 ft. 6 ins.

*Ceiling.*—17 ft. 9 ins.

*Cubic space of each Male Ward.*—61,763 feet.

*Female „* —57,158 feet.

*Number of Windows.*—In each male ward, 27 ; in each female ward, 25.

*Height of all Windows.*—6 ft. 7½ ins.

*Width „* —3 ft. 4 ins.

*Height of Glazed Ventilating Frames above Windows.*—1 ft. 11 ins.

*Width „* —3 ft. 4 ins.

*Total Window Area of each Male Ward.*—768¾ feet.

*Female „* —711¾ feet.

*Walls.*—The ward walls consist in part (about one-third) of brick piers, in part (about two-thirds) of corrugated iron with felt and matchboard lining. The thickness of the brick piers is 1 ft. 7 ins., that of other portions of the wall 6 inches, inclusive of 4½ inches air space intervening between the corrugated iron and the lining. *Roofs,* which are slated externally, have also felt and matchboard lining. They are 7¾ inches in thickness ; this measurement including an air space of 4 inches.

*Lighting and Ventilation of Wards.*—In each opposite side wall of every ward, and in every outer end wall, are double-hung sash windows fitted with venetian blinds. The windows are surmounted by hinged-glazed frames, opening so as to direct upwards incoming air. In addition, fresh air is admitted beneath every ward window by a ventilating apparatus which communicates with the air space in the walls and so with the outer air. This apparatus is so contrived as to limit the amount and modify the direction of currents of admitted air at the discretion of the person in charge of the ward. Provision for escape of ward air is made in the ceiling of the ward by a horizontal shaft, having its under surface of perforated metal, which communicates with other vertical exit shafts alongside each chimney, and has also louvre openings at its free ends.

*Warming of Wards.*—Each ward is warmed by five open fireplaces ; four at opposite sides of two chimney shafts in the central line of the ward, and one at the outer end wall.

*Ward Offices.*—At one end of each ward is an entrance lobby and two rooms, one on each side. These rooms are respectively bath rooms with lavatory and ward scullery. From the centre of one of the side walls of each ward two waterclosets and a slop sink are contained in a projecting building. The closet building itself and an intervening lobby are provided with means of cross ventilation. Dust-bins and coal-sheds are wholly detached from the ward. They are placed in each instance opposite the entrance lobby on the further side of the open corridor by which the several wards are approached.

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NOTES ON THE EPIDEMIC PERIOD 1876-77.

*Period antecedent to establishment of Fulham Hospital.*

Table A. (1.) shows for successive fortnights :—

- a.* (1.) the small-pox mortality of London ; and *a.* (2.) the total small-pox admissions to the hospitals of the Metropolitan Asylums District.
  - c.* the incidence, as measured by admissions to the above hospitals, of small-pox on Chelsea, Fulham, and Kensington parishes.
- [Under heading *b.* will be found the fortnightly period during which Fulham Hospital commenced to receive patients.]

Table A. (2.) shows the extent to which during successive periods houses in the neighbourhood of the Fulham Hospital site became newly invaded by small-pox.

Map A. (1.) shows the geographical position of houses severally invaded in Chelsea, Fulham, and Kensington, and in certain sub-divisions of those parishes, during the period in question.

*Period subsequent to establishment of Fulham Hospital.*

Table A. (3.) shows for successive fortnights :—

- a.* (1.) the small-pox mortality of London ; and *a.* (2.) the total small-pox admissions to the hospitals of the Metropolitan Asylums District.
- b.* the admissions (acute and convalescent cases) into Fulham Hospital from all sources.
- c.* The incidence, as measured by admissions to the above hospitals, of small-pox on Chelsea, Fulham, and Kensington parishes.

Table A. (4.) affords comparison between the amounts of small-pox in Fulham Hospital, period by period, and the extent to which during the successive periods houses in the neighbourhood of that hospital became newly invaded by small pox.

Map. A. (2.) shows the geographical position of the houses severally invaded in Chelsea, Fulham, and Kensington, and in certain sub-divisions of those parishes, during the period in question.

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## EPIDEMIC PERIOD 1876-77.

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*Period antecedent to establishment of Fulham Hospital.*

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

TABLE A. (1.)

Fortnightly Periods ending	a. (1.) Small-pox Mortality of London.	a. (2.) Total Admis- sions into Small-pox Hospitals of the Metro- politan Asylums District.	b. Total Admissions to Fulham Hospital from all sources.		c. Incidence of Small-pox on Chelsea, Fulham, and Kensington Parishes.			
					Incidence on the whole of the three Parishes.		Incidence on those parts of them within one mile of Hospital.	
			Acute Cases	Conva- lescent Cases.	Persons at- tacked.	Houses newly invaded.	Persons at- tacked.	Houses newly invaded.
1876.								
15 April ..	4	2	—	—	1	1	—	—
29 " ..	—	6	—	—	—	—	—	—
13 May ..	2	15	—	—	—	—	—	—
27 " ..	4	12	—	—	4	4	1	1
10 June.. ..	6	34	—	—	1	1	—	—
21 " .. ..	6	24	—	—	—	—	—	—
8 July .. ..	18	52	—	—	1	1	—	—
22 " .. ..	10	25	—	—	1	1	—	—
5 August ..	8	42	—	—	1	1	—	—
19 " .. ..	14	21	—	—	5	5	—	—
2 September	18	274 Eight Weeks Return	—	—	3	3	—	—
16 " .. ..	21		—	—	4	4	—	—
30 " .. ..	26		—	—	1	—	—	—
14 October ..	27		—	—	—	—	—	—
28 " .. ..	37	97	—	—	1	1	—	—
11 November..	69	122	—	—	4	3	—	—
25 " .. ..	95	236	—	—	7	7	—	—
9 December .	117	367	—	—	16	15	3	3
23 " .. ..	172	263	—	—	35	22	3	2
1877.								
6 January ..	191	268	—	—	24	18	6	5
20 " .. ..	179	240	—	—	17	11	—	—
3 February ..	189	341	—	—	22	15	2	2
17 " .. ..	162	430	—	—	14	11	3	2
3 March .. ..	188	443	—	—	13	9	2	2
17 " .. ..	196	457	—	35	9	11	1	1
March 1876 to March 1877 }	1,757	3,751	—	35	184	144	21	18

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TABLE A. (2.)

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surrounding it,  
by Mr. W. H.  
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Small-pox Cases from all sources received into Hospital during period.				Period, Fortnight ending	Within one mile of the Hospital; Houses becoming newly invaded.				The same in rates per cent. of Houses.				
Acute Cases.	Convalescent Cases.	Total such Houses.	Of which situated.				Rate on total Houses.	Rate on Houses 0 to $\frac{1}{4}$ mile.	Rate on Houses $\frac{1}{4}$ to $\frac{1}{2}$ mile.	Rate on Houses $\frac{1}{2}$ to $\frac{3}{4}$ mile.	Rate on Houses $\frac{3}{4}$ to 1 mile.		
			Under $\frac{1}{4}$ mile from Hospital.		In Ring $\frac{1}{4}$ - $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ - $\frac{3}{4}$ mile from Hospital.						In Ring $\frac{3}{4}$ -1 mile from Hospital.	
		1876.											
—	—	15 April .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	29 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	13 May .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	27 " .. ..	1	—	—	—	1	'00	—	—	—	—	'02
—	—	10 June .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	24 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	8 July .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	22 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	5 August .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	19 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	2 Sept. .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	16 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	30 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	14 October .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	28 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	11 Nov. .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	25 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	9 Dec. .. ..	3	—	1	1	1	'02	—	'02	'02	'02	'02
—	—	23 " .. ..	2	—	—	2	—	'01	—	—	'04	—	—
		1877.											
—	—	6 Jan .. ..	5	1	—	1	3	'04	'23	—	'02	'08	'08
—	—	20 " .. ..	—	—	—	—	—	—	—	—	—	—	—
—	—	3 Feb. .. ..	2	—	—	2	—	'01	—	—	'04	—	—
—	—	17 " .. ..	2	—	—	1	1	'01	—	—	'02	'02	'02
—	—	3 March .. ..	2	—	—	1	1	'01	—	—	'02	'02	'02
—	35	17 " .. ..	1	—	1	—	—	'00	—	'02	—	—	—
—	35	{ March 1876 to March 1877. }	18	1	2	8	7	'15	'23	'05	'18	'19	'19



EPIDEMIC PERIOD 1876-77.

APP. No. 2.

Period subsequent to establishment of Fulham Hospital.

On the Influence of the Fulham Hospital on the neighbourhood surrounding it, by Mr. W. H. Power.

TABLE A. (3.)

Fortnightly Period ending	a. (1.)  Small-pox Mortality of London.	a. (2.)  Total Admis- sions into Small-pox Hospitals of the Metro- politan Asylums District.	b.		c.  Incidence of Small-pox on Chelsea, Fulham, and Kensington Parishes.			
			Total Admissions to Fulham Hospital from all sources.		Incidence on the whole of the three Parishes.		Incidence on parts of them within one mile of the Hospital.	
			Acute Cases.	Conva- lescent Cases.	Persons at- tacked.	Houses newly invaded.	Persons at- tacked.	Houses newly invaded.
1877.								
31 March ..	162	469	14	74	16	11	2	1
14 April ..	138	423	12	48	26	23	6	6
28 " ..	158	396	11	14	23	17	8	6
12 May ..	132	388	22	23	43	33	4	4
26 " ..	139	495	37	75	41	29	9	7
9 June.. ..	119	406	41	20	38	28	6	6
23 " .. ..	99	323	32	—	30	21	12	8
7 July .. ..	67	201	21	—	18	12	5	5
21 " .. ..	67	283	37	4	32	23	12	10
4 August ..	49	173	36	—	33	26	13	13
18 " .. ..	41	264 { Six Weeks Return	15	—	11	11	7	7
1 September	31		16	—	11	7	7	4
15 " .. ..	18		10	—	6	5	2	2
29 " .. ..	23	67	14	—	11	9	7	6
13 October ..	28	60	8	—	9	6	8	6
27 " .. ..	22	81	1	—	34	25	16	11
10 November..	34	98	—	16	16	12	9	8
24 " .. ..	41	97	—	10	9	5	6	3
8 December..	56	131	—	18	11	8	8	6
22 " .. ..	62	165	—	16	22	16	15	11
1878.								
5 January ..	55	164	—	10	8	5	3	—
March 1877 to } end of 1877. }	1,541	4,684	327	328	448	332	165	130

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Period subsequent to establishment of Fulham Hospital.

TABLE A. (4.)

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Small-pox Cases from all sources received into Fulham Hospital during period.		Period, Fortnight ending	Within one mile of the Hospital: Houses becoming newly invaded.				The same in rates per cent. of Houses.						
Acute Cases.	Convalescent Cases.		Total such House..	Of which situated.				Rate on total Houses.	Rate on Houses 0- $\frac{1}{4}$ mile.	Rate on Houses $\frac{1}{4}$ - $\frac{1}{2}$ mile.	Rate on Houses $\frac{1}{2}$ - $\frac{3}{4}$ mile.	Rate on Houses $\frac{3}{4}$ -1 mile.	
				Under $\frac{1}{4}$ mile from Hospital.	In Ring $\frac{1}{4}$ - $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ - $\frac{3}{4}$ mile from Hospital.	In Ring $\frac{3}{4}$ - 1 mile from Hospital.						
1877.													
14	74	31 March .. ..	1	—	—	1	—	·00	—	—	·02	—	
12	48	14 April .. ..	6	—	1	5	—	·05	—	·02	·11	—	
11	14	28 „ .. ..	6	1	3	1	1	·05	·23	·08	·02	·02	
22	23	12 May .. ..	4	—	1	3	—	·03	—	·02	·07	—	
37	75	26 „ .. ..	7	—	3	3	1	·05	—	·08	·07	·02	
41	20	9 June .. ..	6	—	—	3	3	·05	—	—	·07	·08	
32	—	23 „ .. ..	8	2	4	1	1	·06	·46	·11	·02	·02	
21	—	7 July .. ..	5	2	3	—	—	·04	·46	·08	—	—	
37	4	21 „ .. ..	10	2	6	2	—	·08	·46	·17	·04	—	
36	—	4 August .. ..	13	2	8	2	1	·11	·46	·22	·04	02	
15	—	18 „ .. ..	7	1	2	3	1	·05	·23	·05	·07	·02	
16	—	1 Sept. .. ..	4	—	1	2	1	·03	—	·02	·04	·02	
10	—	15 „ .. ..	2	1	1	—	—	·01	·23	·02	—	—	
14	—	29 „ .. ..	6	1	1	2	2	·05	·23	·02	·04	·05	
8	—	13 October.. ..	6	1	2	3	—	·05	·23	·05	·07	—	
1	—	27 „ .. ..	11	1	2	8	—	·09	·23	·05	·18	—	
—	16	10 Nov. .. ..	8	1	2	5	—	·06	·23	·05	·11	—	
—	10	24 „ .. ..	3	—	1	2	—	·02	—	·02	·04	—	
—	18	8 Dec. .. ..	6	—	5	—	1	·05	—	·14	—	·02	
—	16	22 „ .. ..	11	—	2	8	1	·09	—	·05	·18	·02	
1878.													
—	10	5 January .. ..	—	—	—	—	—	—	—	—	—	—	
327	328	{ March 1887 to end of 1877. }	130	15	48	54	13	1·10	3·47	1·37	1·27	·36	



On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
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Power.

### NOTES ON EPIDEMIC PERIOD (January to August) 1878.

Table B. (1.) shows for successive fortnights :—

- a.* (1.) the small-pox mortality of London; and *a.* (2.) the total small-pox admissions to the hospitals of the Metropolitan Asylums District.
- b.* the admissions (acute and convalescent cases) into Fulham Hospital from all sources.
- c.* the incidence, as measured by admissions to the above hospitals, of small-pox on Chelsea, Fulham, and Kensington parishes.

Table B. (2.) affords comparison between the amounts of small-pox in Fulham Hospital, period by period, and the extent to which during the successive periods houses in the neighbourhood of that Hospital became newly invaded by small pox.

Map. B. shows the geographical position of the houses severally invaded in Chelsea, Fulham, and Kensington, and in certain sub-divisions of those parishes, during the epidemic period in question.

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EPIDEMIC PERIOD (January to August) 1878.

APP. No. 2.

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
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Power.

TABLE B. (1.)

Fortnightly Period ending	a. (1.)  Small-pox Mortality of London.	a. (2.)  Total Admis- sions into Small-pox Hospitals of the Metro- politan Asylums District.	b.  Total Admission to Fulham Hospital from all sources.		c.  Incidence of Small-pox on Chelsea, Fulham, and Kensington Parishes.			
					Incidence on the whole of the three parishes.		Incidence on those parts of them within one mile of Hospital.	
			Acute Cases.	Conva- lescent Cases.	Persons at- tac ed.	Houses newly invaded.	Persons attacked.	Houses newly invaded.
1878.								
12 January ..	61	242	1	*32	6	5	3	3
26   "   ..	85	261	2	31	11	10	5	4
9 February ..	93	279	35	41	12	8	4	4
23   "   ..	86	296	39	75	13	12	8	8
9 March   ..	88	316	46	96	27	26	11	11
23   "   ..	95	262	37	29	26	23	13	12
6 April   ..	103	366	76	15	47	42	23	20
20   "   ..	138	473	115	25	81	69	54	49
4 May   ..	123	391	85	—	49	37	25	23
18   "   ..	96	343	89	—	66	51	34	26
1 June   ..	83	250	64	—	39	27	22	16
15   "   ..	66	187	48	—	30	22	19	15
29   "   ..	57	168	36	—	23	19	11	10
13 July   ..	30	104	15	—	9	6	6	4
27   "   ..	30	128	14	—	12	10	9	7
16 August ..	32	125 Four Weeks Return	10	—	1	1	—	—
24   "   ..	19		2	—	1	—	1	—
Jan. 1878 to Aug. 1878. }	1,285	4,191	714	344	453	368	248	211

\* Other 60 convalescents received in November and December, 1877.



## EPIDEMIC PERIOD (January to August) 1878.

APP. No. 2.

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

TABLE B. (2.)

Small-pox Cases from all sources received into Fulham Hospital during period.		Period, Fortnight ending	Within one mile of the Hospital ; Houses becoming newly invaded.					The same in rates per cent. of Houses.				
Acute Cases.	Convalescent Cases.		Total such houses.	Of which situated.				Rate on total Houses.	Rate on Houses 0 to $\frac{1}{4}$ mile.	Rate on Houses $\frac{1}{4}$ to $\frac{1}{2}$ mile.	Rate on Houses $\frac{1}{2}$ to $\frac{3}{4}$ mile.	Rate on Houses $\frac{3}{4}$ to 1 mile.
				Under $\frac{1}{4}$ mile from Hospital.	In Ring $\frac{1}{4}$ to $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ to $\frac{3}{4}$ mile from Hospital.	In Ring $\frac{3}{4}$ to 1 mile from Hospital.					
		1878.										
1	32*	12 January	2	—	—	2	—	*01	—	—	*04	—
2	31	26 " ..	4	—	1	3	—	*03	—	*02	*07	—
35	41	9 February	4	—	2	2	—	*03	—	*05	*04	—
39	75	23 " ..	8	2	1	3	2	*06	*46	*02	*07	*05
46	96	9 March ..	11	2	4	5	—	*09	*46	*11	*11	—
37	29	23 " ..	12	—	6	5	1	*10	—	*17	*11	*02
76	15	6 April ..	20	2	7	5	6	*16	*46	*20	*11	*16
115	25	20 " ..	49	5	24	17	3	*41	1*15	*68	*40	*08
85	—	4 May ..	23	1	11	10	1	*19	*23	*31	*23	*02
89	—	18 " ..	26	1	14	9	2	*22	*23	*40	*21	*05
64	—	1 June ..	16	1	7	5	3	*13	*23	*20	*11	*08
48	—	15 " ..	15	2	5	7	1	*12	*46	*14	*16	*02
36	—	29 " ..	10	1	3	3	3	*08	*23	*08	*07	*08
15	—	13 July ..	4	1	1	1	1	*03	*23	*02	*02	*02
14	—	27 " ..	7	2	3	1	1	*05	*46	*08	*02	*02
10	—	10 August..	—	—	—	—	—	—	—	—	—	—
2	—	24 " ..	—	—	—	—	—	—	—	—	—	—
714	344 {	Jan. 1878 to August 1878.	} 211	20	89	78	24	1*80	4*62	2*55	1*84	*67

\* Other 60 convalescents received in November and December, 1877.

On the  
Influence of  
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### NOTES ON EPIDEMIC PERIOD 1878-79.

Table C. (1.) shows for successive fortnights :—

- a.* (1.) the small-pox mortality of London ; and *a.* (2.) the total small-pox admissions to the hospitals of the Metropolitan Asylums District.
- b.* the admissions (acute and convalescent cases) into Fulham Hospital from all sources.
- c.* the incidence, as measured by admissions to the above hospitals, of small-pox on Chelsea, Fulham, and Kensington parishes.

Table C. (2.) affords comparison between the amounts of small-pox in Fulham Hospital, period by period, and the extent to which during the successive periods houses in the neighbourhood of that hospital became newly invaded by small-pox.

Map. C. shows the geographical position of the houses severally invaded in Chelsea, Fulham, and Kensington, and in certain sub-divisions of these parishes during the epidemic period in question.

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## EPIDEMIC PERIOD 1878-79.

APP. No. 2.

TABLE C. (1.)

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

Fortnightly Periods ending	a. (1.)  Small-pox Mortality of London.	a. (2.)  Total Admis- sions into Small-pox Hospitals of the Metro- politan Asylums District.	b.  Total Admissions to Fulham Hospital from all sources.		c.  Incidence of Small-pox on Chelsea, Fulham, and Kensington Parishes.			
			Acute Cases.	Conva- lescent Cases.	Incidence on the whole of the three Parishes.		Incidence on those parts of them with none male of the Hospital.	
					Persons at- tacked.	Houses newly invaded.	Persons at- tacked.	Houses newly invaded.
1878.								
7 September	9	51 Four Weeks Return.	1	—	—	—	—	—
21 "	11		—	—	—	—	—	—
5 October ..	6	28	3	—	1	1	1	1
19 " ..	10	24	4	—	2	—	2	—
2 November	7	50	6	—	2	2	1	1
16 "	25	70	4	—	3	2	2	2
30 "	15	71	10	—	2	2	2	2
14 December	21	103	10	—	1	—	1	—
28 "	27	248 Four Weeks Return.	6	—	2	2	1	1
1879.								
11 January ..	25	150	15	—	12	10	9	7
25 " ..	30		15	25	3	2	3	2
8 February	45	120	38	—	19	18	7	7
22 "	37	167	56	—	17	10	6	4
8 March ..	39	108	57	—	32	27	23	18
22 " ..	30	99	51	—	30	24	16	15
5 April ..	26	87	37	—	22	21	16	15
19 " ..	25	83	45	—	32	17	17	13
3 May ..	20	86	55	—	43	30	35	23
17 " ..	11	78	49	—	25	18	19	13
31 " ..	25	176 Four Weeks Return.	41	—	22	21	13	12
14 June ..	22		51	—	41	39	25	24
28 " ..	20	86	32	2	17	15	12	11
12 July ..	15	54	27	—	16	14	10	9
26 " ..	12	37	19	—	17	14	11	9
9 August ..	8	108 Four Weeks Return.	16	—	7	4	—	—
23 " ..	8		19	—	12	8	7	5
6 September	14	43 Four Weeks Return.	12	—	8	6	3	3
20 "	4		—	—	—	—	—	—
Sept. 1878 to } Sept. 1879. }	553	2,127	679	27	388	307	242	197

## EPIDEMIC PERIOD 1878-79.

TABLE C. (2.)

APP. No. 2.

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

Small-pox Cases from all sources received into Fulham Hospital during period.		Period,  Fortnight  ending	Within one mile of the Hospital; Houses becoming newly invaded.				The same in rates per cent. of Houses.						
Acute Cases.	Convalescent Cases.		Total such Houses.	Of which situated.				Rate on total Houses.	Rate on Houses 0- $\frac{1}{4}$ mile.	Rate on Houses $\frac{1}{4}$ - $\frac{1}{2}$ mile.	Rate on Houses $\frac{1}{2}$ - $\frac{3}{4}$ mile.	Rate on Houses $\frac{3}{4}$ -1 mile.	
				Under $\frac{1}{4}$ mile from Hospital.	In Ring $\frac{1}{4}$ - $\frac{1}{2}$ mile from Hospital.	In Ring $\frac{1}{2}$ - $\frac{3}{4}$ mile from Hospital.	In Ring $\frac{3}{4}$ -1 mile from Hospital.						
1878.													
1	—	7 Sept. .. ..	—	—	—	—	—	—	—	—	—	—	
—	—	21 " .. ..	—	—	—	—	—	—	—	—	—	—	
3	—	5 Oct. .. ..	1	—	—	1	—	'00	—	—	'02	—	
4	—	19 " .. ..	—	—	—	—	—	—	—	—	—	—	
6	—	2 Nov. .. ..	1	—	1	—	—	'00	—	'02	—	—	
4	—	16 " .. ..	2	—	—	2	—	'01	—	—	'04	—	
10	—	30 " .. ..	2	—	2	—	—	'01	—	'05	—	—	
10	—	14 Dec. .. .	—	—	—	—	—	—	—	—	—	—	
6	—	28 " . ..	1	—	—	—	1	'00	—	—	—	'02	
1879.													
15	—	11 Jan. .. ..	7	1	4	1	1	'05	'23	'11	'02	'02	
15	25	25 " .. ..	2	1	—	—	1	'01	'23	—	—	'02	
38	—	8 Feb. .. ..	7	—	4	3	—	'05	—	'11	07	—	
56	—	22 " .. ..	4	1	3	—	—	'03	'23	'08	—	—	
57	—	8 March .. ..	18	3	5	8	2	'15	'69	'14	'18	'05	
51	—	22 " .. ..	15	2	8	4	1	'12	'46	'22	'09	'02	
37	—	5 April .. ..	15	—	9	4	2	'12	—	'25	'09	'05	
45	—	19 " .. ..	13	1	7	4	1	'11	'23	'20	'09	'02	
55	—	3 May .. ..	23	1	12	8	2	'19	'23	'34	'18	'05	
49	—	17 " .. ..	13	2	4	6	1	'11	'46	'11	'14	'02	
41	—	31 " .. ..	12	1	7	2	2	'10	'23	'20	04	'05	
51	—	14 June .. ..	24	—	13	6	5	'20	—	'37	'14	'14	
32	2	28 " .. ..	11	3	3	4	1	'09	'69	'08	'09	'02	
27	—	12 July .. ..	9	—	7	2	—	'07	—	'20	'04	—	
19	—	26 " .. ..	9	2	1	4	2	'07	'46	'02	09	'05	
16	—	9 August .. ..	—	—	—	—	—	—	—	—	—	—	
19	—	23 " .. ..	5	—	1	3	1	'04	—	'02	'07	'02	
12	—	6 Sept. .. ..	3	1	1	1	—	'02	'23	'02	'02	—	
—	—	20 " .. ..	—	—	—	—	—	—	—	—	—	—	
679	27	{ Sept. 1878 to Sept. 1879. }	197	19	92	63	23	1'68	4'40	2'63	1'49	'64	



### NOTES ON EPIDEMIC PERIOD 1880.

Table D. (1.) shows for successive fortnights :—

- a.* (1.) the small-pox mortality of London ; and *a.* (2.) the total small-pox admissions to the hospitals of the Metropolitan Asylums District.
- b.* the admissions (all acute cases) into Fulham Hospital from all sources.
- c.* the incidence, as measured by admissions to the above hospitals, of small-pox on Chelsea, Fulham, and Kensington parishes.

Table D. (2.) affords comparison between the amounts of small-pox in Fulham Hospital, period by period, and the extent to which during the successive periods houses in the neighbourhood of that hospital became newly invaded by small-pox.

Map D. shows the geographical position of the houses severally invaded in Chelsea, Fulham, and Kensington, and in certain sub-divisions of these parishes, during the epidemic period in question.

*Mem.* The actual number of houses upon which the several rates are calculated has been learned from an Enumeration of 1880. The number within the quarter-mile circle was 432 ; in the first ring, 3,488 ; in the second ring, 4,224 ; in the third and most distant ring, 3,569 ; giving a total of 11,713 houses within the special area of one mile radius.

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## EPIDEMIC PERIOD 1880.

TABLE D. (1.)

APP. No. 2.

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

Fortnightly Period ending	a. (1.)  Small-pox Mortality of London.	a. (2.)  Total Admis- sions into Small-pox Hospitals of the Metro- politan Asylums District.	b.		c.  Incidence of Small-pox on Chelsea, Fulham, and Kensington Parishes.			
			Total Admissions to Fulham Hospital from all sources.		Incidence on the whole of the three Parishes.		Incidence on those parts of them within one mile of the Hospital.	
			Acute Cases.	Conva- lescent Cases.	Persons at- tacked.	Houses newly invaded.	Persons at- tacked.	Houses newly invaded.
1879.								
27 September	3	43	6	—	3	—	2	—
11 October ..	4	15	3	—	1	1	1	1
25 „ ..	6	8	5	—	—	—	—	—
8 November	4	14	5	—	—	—	—	—
22 „ ..	1	20	5	—	—	—	—	—
6 December	8	20	3	—	—	—	—	—
20 „ ..	5	13	13	—	3	3	3	3
1880.								
3 January ..	6	71 Four Weeks Return.	13	—	3	3	3	3
17 „ ..	12		18	—	3	3	3	3
31 „ ..	14		21	—	10	9	8	7
14 February	25		37	—	15	13	14	12
28 „ ..	26	102	25	—	19	15	18	14
13 March ..	21	112	15	—	11	10	10	8
27 „ ..	15	66	8	—	4	2	4	2
10 April ..	22	72	4	—	—	—	—	—
24 „ ..	24	80	4	—	2	2	—	—
8 May ..	28	96	4	—	—	—	—	—
22 „ ..	18	89	15	—	4	4	—	—
5 June ..	18	94	15	—	5	5	2	2
19 „ ..	16	69	19	—	3	3	1	1
3 July ..	27	93	6	—	3	2	1	1
17 „ ..	7	65	9	—	3	3	3	3
31 „ ..	7	49	6	—	2	2	2	2
14 August ..	8	76 Four Weeks Return.	2	—	1	1	—	—
28 „ ..	7		6	—	1	1	1	1
11 September	10	76 Four Weeks Return.	8	—	3	3	1	1
25 „ ..	8		6	—	2	1	2	1
9 October ..	7	29	2	—	1	1	—	—
23 „ ..	13	34	3	—	2	2	2	2
6 November	9	39	1	—	2	2	—	—
20 „ ..	27	60	2	—	1	1	1	1
4 December	29	159	3	—	1	1	—	—
Sept. 1879 to Dec. 1880. }	435	1,744	292	—	108	92	8	68



## EPIDEMIC PERIOD 1880.

TABLE D. (2.)

APP. No. 2.

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

Small-pox cases from all sources received into Fulham Hospital during period.		Period, Fortnight ending	Within one mile of the Hospital; Houses becoming newly invaded.					The same in rates per cent. of Houses.				
Acute Cases.	Convalescent Cases.		Total such houses.	Of which situated.				Rate on total Houses.	Rate on Houses 0 to ¼ mile.	Rate on Houses ¼ to ½ mile.	Rate on Houses ½ to ¾ mile.	Rate on Houses ¾ to 1 mile.
				Under ¼ mile from Hospital.	In Ring ¼-½ mile from Hospital.	In Ring ½-¾ mile from Hospital.	In Ring ¾-1 mile from Hospital.					
6	—	1879. 27 Sept. .. ..	—	—	—	—	—	—	—	—	—	—
3	—	11 October.. ..	1	—	1	—	—	*00	—	*02	—	—
5	—	25    "    .. ..	—	—	—	—	—	—	—	—	—	—
5	—	8 Nov.    .. ..	—	—	—	—	—	—	—	—	—	—
5	—	22    "    .. ..	—	—	—	—	—	—	—	—	—	—
3	—	6 Dec.    .. ..	—	—	—	—	—	—	—	—	—	—
13	—	20    "    .. ..	3	—	2	1	—	*02	—	*05	*02	—
13	—	1880. 3 January .. ..	3	—	2	—	1	*02	—	*05	—	*02
18	—	17    "    .. ..	3	—	3	—	—	*02	—	*08	—	—
21	—	1    "    .. ..	7	1	3	2	1	*05	*23	*08	*04	*02
37	—	14 February .. ..	12	2	5	4	1	*10	*46	*14	*08	*02
25	—	28    "    .. ..	14	2	7	2	3	*11	*46	*20	*04	*08
15	—	13 March .. ..	8	1	5	—	2	*05	*23	*14	—	*05
8	—	27    "    .. ..	2	1	—	1	—	*01	*23	—	*02	—
4	—	10 April .. ..	—	—	—	—	—	—	—	—	—	—
4	—	24    "    .. ..	—	—	—	—	—	—	—	—	—	—
4	—	8 May .. ..	—	—	—	—	—	—	—	—	—	—
15	—	22    "    .. ..	—	—	—	—	—	—	—	—	—	—
15	—	5 June .. ..	2	—	1	1	—	*01	—	*02	*02	—
19	—	19    "    .. ..	1	—	1	—	—	*00	—	*02	—	—
6	—	3 July .. ..	1	—	—	1	—	*00	—	—	*02	—
9	—	17    "    .. ..	3	—	1	—	2	*02	—	*02	—	*05
6	—	31    "    .. ..	2	—	2	—	—	*01	—	*05	—	—
2	—	14 August .. ..	—	—	—	—	—	—	—	—	—	—
6	—	28    "    .. ..	1	—	1	—	—	*00	—	*02	—	—
8	—	11 Sept. .. ..	1	—	1	—	—	*00	—	*02	—	—
6	—	25    "    .. ..	1	—	1	—	—	*00	—	*02	—	—
2	—	9 October.. ..	—	—	—	—	—	—	—	—	—	—
3	—	23    "    .. ..	2	1	1	—	—	*01	*23	*02	—	—
1	—	6 Nov. .. ..	—	—	—	—	—	—	—	—	—	—
2	—	20    "    .. ..	1	—	—	1	—	*00	—	—	*02	—
3	—	4 Dec. .. ..	—	—	—	—	—	—	—	—	—	—
292	—	{ Sept. 1879 to } { Dec. 1880. }	68	8	37	13	10	*58	1'85	1'06	*30	*28

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

### NOTES ON EPIDEMIC PERIOD 1880-81.

Table E. (1.) shows for successive fortnights :—

- a.* (1.) the small pox mortality of London; and *a.* (2.) the total admissions to the hospitals of the Metropolitan Asylums District.
- b.* the admissions (acute and convalescent cases) into Fulham Hospital from all sources.
- c.* the incidents of small-pox on Chelsea, Fulham, and Kensington parishes.

Table E. (2.) affords comparison between the amounts of small-pox in Fulham Hospital, period by period, and the extent to which during the successive periods houses in the neighbourhood of that hospital became newly invaded by small-pox.

Map. E. shows the geographical position of the houses severally invaded in Chelsea, Fulham, and Kensington, and in certain sub divisions of those parishes during the period in question.

Mapping of distribution of the earlier epidemic outburst is given in the text.

[In the above tables and in the two maps the time of small-pox incidence refers to *date of attack*, and not, as in previous tables and maps, to *date of admission to hospital*. Also, in each instance, the amount of small-pox incidence on the neighbourhood of Fulham Hospital includes cases treated privately in addition to those admitted to Hospital.]

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## EPIDEMIC PERIOD 1880-81.

APP. No. 2.

TABLE E. (1.)

Fortnightly Period ending	a. (1.) Small-pox Mortality of London.	a. (2.) Total Admis- sions into Small-pox Hospitals of the Metro- politan Asylums District.	b. Total Admissions to Fulham Hospital from all sources.		c. Incidence of Small-pox on Chelsea, Fulham, and Kensington Parishes.			
					Incidence on the whole of the three Parishes.		Incidence on those parts of them within one mile of the Hospital.	
			Acute Cases.	Conva- lescent Cases.	Persons at- tacked.	Houses newly invaded.	Persons at- tacked.	Houses newly invaded.
1880. 25 December ..	48	152	8	40	—	—	—	—
1881. 8 January ..	50	219	24	70	4	4	2	2
22 „ ..	69	227	48	22	7	7	5	5
5 February ..	106	325	80	63	62	56	47	41
19 „ ..	107	371	67	10	38	28	29	21
5 March ..	96	386	91	—	59	42	38	24
19 „ ..	101	426	95	—	59	43	28	24
2 April ..	105	376	102	12	41	37	26	25
Dec. 1880 to end of March 1881. }	682	2,482	515	217	270	217	175	142

On the  
Influence of  
the Fulham  
Hospital on the  
neighbourhood  
surrounding it,  
by Mr. W. H.  
Power.

## EPIDEMIC PERIOD 1880-81.

TABLE E. (2.)

Small-pox Cases from all sources received in Hospital during period.		Period Fortnight ending	Within one mile of Hospital; Houses becoming newly invaded.					The same in rates per cent. of Houses.				
			Total such Houses.	Of which situated.				Rate on total Houses.	Rate on Houses 0-1 mile.	Rate on Houses 1-1 mile.	Rate on Houses 1-1 mile.	Rate on Houses 1-1 mile.
				Under 1 mile from Hospital.	In Ring 1-1 mile from Hospital.	In Ring 1-1 mile from Hospital.	In Ring 1-1 mile from Hospital.					
8	40	1880. 25 Dec. ..	—	—	—	—	—	—	—	—	—	—
24	79	1881. 8 Jan. ..	2	—	—	1	1	0'1	—	—	'02	'02
48	22	22 „ ..	5	—	1	3	1	0'4	—	'02	'07	'02
80	63	5 Feb. ..	41	7	20	10	4	'35	1'62	'57	'23	'11
67	10	19 „ ..	21	2	6	9	4	'18	'46	'17	'21	'11
91	—	5 March ..	24	—	8	11	5	'20	—	'22	'26	'14
95	—	19 „ ..	24	2	11	7	4	'20	'46	'31	'16	'11
102	12	2 April ..	25	2	8	12	3	'21	'46	'22	'28	'08
515	217	{ Dec. 1880 to end of March 1881. }	142	13	54	53	22	1'21	3'00	1'54	1'25	'61





1880. MONTH AND DAY.		MOON.  Phases of Moon.	BARO- METER.		READINGS OF THERMOMETERS.					DIFFERENCE.			WIND. As deduced from Anemometers.		Robinson's.  Horizontal Movement of Air each day.		Departure from Average.		
			Mean daily reading (cor- rected and re- duced).	Inches.	Dry.		Dew Point.	High- est in the Sun.	Low- est on the Grass.	Between Dew Point and Air Temperature.		Humidity : Saturation = 100.	Osler's.					Pressure on square foot.	
					High- est.	Low- est.				Range in day.	Mean daily value.		Mean daily value.	Great- est.					Least.
DECEMBER.																			
SUN. .. 5	—	—	30·318	51·1	43·6	7·5	48·1	42·6	0	0	0	0	0	0	0	0	0	0	
MON. .. 6	—	—	30·311	51·9	47·2	4·7	49·7	47·0	42·6	58·8	35·0	7·4	2·0	0·5	81	WSW.	SW.	2·2	
TUES. .. 7	—	—	30·459	52·3	44·0	8·3	48·0	45·3	47·0	57·0	39·0	2·7	0·5	0·5	91	SW. & WSW.	WSW. & W.	1·5	
WED. .. 8	First Qr. in Equator.	—	30·387	49·7	46·0	3·7	48·3	43·7	45·3	67·0	45·4	2·7	0·5	0·5	91	WSW. & W.	WSW. & SW.	0·0	
THURS. 9	—	—	30·230	51·2	44·2	7·0	48·2	44·8	43·7	52·5	45·4	1·6	1·0	1·0	84	WSW.	WSW. & W.	4·2	
FRI. .. 10	—	—	30·113	55·8	42·5	13·3	50·3	44·6	48·2	56·6	39·0	3·4	1·0	1·0	88	W. & WSW.	W. & WSW.	3·7	
SAT. .. 11	—	—	30·053	46·1	36·5	9·6	41·6	38·9	44·6	67·1	37·0	5·1	0·5	0·5	81	WSW. & W.	W. & NW.	4·5	
MEANS ..	—	—	30·267	51·2	43·4	7·7	47·7	43·8	38·9	57·7	30·7	2·7	1·2	0·9	90	WSW. & SW.	WSW. & SW.	2·4	
									3·9	5·5	1·2	5·0	87	WSW.				—	
									Sum	55·2	Sum	55·4				Sum	237·2	+ 235	
'DATE.		RAIN.		Ozone.		ELECTRICITY.		Registered Sunshine in hours.		Sun above Horizon in hours.		SKY AND ATMOSPHERE.							
DECEMBER.		Gauge surface 5 in. above the ground.																	
SUNDAY .. 5	.. 6	Inches. 0·00 0·00	5·0 4·0	mod. Positive throughout weak Positive generally .. ..		.. ..		0·0 0·0		8·0 8·0		Cloudy throughout. Overcast generally, except for a brief time in afternoon when the clouds were somewhat broken. Cloudy throughout.		NOTE.—For explanation of any point that may not be readily intelli- gible, see last page of the Registrar General's Weekly Returns.					
TUESDAY .. 7		0·00	0·0	weak Positive in morning ; variable Positive afterwards.		.. ..		0·0		7·9		Generally overcast. Cloudy throughout. Slight lunar halo.							
WEDNESDAY .. 8		0·00	0·0	weak Positive generally .. ..		.. ..		0·3 0·0		7·9 7·9									
THURSDAY .. 9		0·00	0·0	weak Positive in morning ; mod. Positive afterwards.		.. ..		2·1		7·9		Generally cloudy. Lunar halo at night.							
FRIDAY .. 10		0·00	0·5	weak Positive in morning ; variable Positive afterwards.		.. ..		2·8		7·8		A very fine day. Very little cloud pre- vailed generally.							
SATURDAY .. 11		0·00	1·4					Sum		55·4									
MEANS .. ..	.. ..	Sum 0·00						Sum		55·4									

METEOROLOGICAL OBSERVATIONS taken at the ROYAL OBSERVATORY, GREENWICH, during the Week ending Saturday. 18th DECEMBER, 1880.  
 [Under the Superintendence of the Astronomer Royal.]

1880. MONTH AND DAY.		MOON.  Phases of Moon.	BARO- METER.  Mean daily reading (cor- rected and re- duced).	READINGS ON THERMOMETERS.						DIFFERENCE.			WIND. As deduced from Anemometers.				Robinson's.  Horizontal Movement of Air each day.		Departure from Average.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
				Dry.			Dew Point.	High- est in the Sun.	Low- est on the Grass.	Between Dew Point and Air Temperature.		From average of 20 years.	Humidity : Satura- tion = 100.	General Direction.		Pressure on square foot.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
				High- est.	Low- est.	Range in day.				Mean daily value.	Mean daily value.			Great- est.	Least.	Great- est.				Least.	A.M.	P.M.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
DECEMBER.			ins.	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	



1880. MONTH AND DAY.		MOON.	READINGS OF THERMOMETERS.				DIFFERENCE.		WIND. As deduced from Anemometers.			Robinson's.				
			Baro- meter	Dry.	Dew Point.	High- Low- est	Low- est.	Mean daily value.	Between Dew Point and Air Temperature.	Satura- tion 100.	General Direction.	Pressure on square foot.	Horizontal Movement of Air each day.	Defeat- ure from Average.		
		Phases of Moon	Mean daily reading (cor- rected and re- duced).	Low- est.	Range in day.	Mean daily value.	in the Sun. Grass.	Mean Great- est.	Least.	Humidity :	A.M.	P.M.	Great est.	Mean of 24 Obs.	Miles.	Miles.
DECEMBER.																
SUN. ..	19	—	29.366	37.0	7.6	33.9	55.2	11.5	1.0	77	SSW. & SW.	WSW. & SW.	9.5	0.6	439	+129
MON. ..	20	—	29.319	33.2	8.0	35.6	41.2	1.7	0.0	100	SSW. & NE.	NE. N. NW.	0.0	0.0	205	-104
TUES. 21		—	29.821	29.5	9.3	31.8	46.5	5.5	0.0	89	WSW. & NW.	NNW. & SW.	2.3	0.1	258	-49
WED. ..	22	—	29.570	28.9	24.1	43.2	53.0	3.6	0.0	97	SW.	SW.	8.0	0.9	410	+105
THURS. 23		In Equator.	29.331	48.5	5.1	50.7	73.5	6.4	2.0	85	SW. & WSW.	SW.	11.0	1.7	585	+282
FRI. ..	24	Last Qr.	29.089	36.5	14.1	44.3	72.0	7.4	1.7	81	SW. & WSW.	WSW. & W.	12.5	1.0	516	+215
SAT. ..	25	—	29.405	30.5	7.3	34.0	49.9	9.6	2.0	78	WSW.	W. WNW. & WSW.	1.7	0.0	377	+77
MEANS ..		—	29.414	34.9	10.8	40.6	55.9	6.5	1.0	87	SW.		—	—	Sum 2790	Sum +655
DATE.		RAIN.		Ozone.	ELECTRICITY.			Registered Sunshine, in hours.	Sun above Horizon, in hours.	SKY AND ATMOSPHERE.						
DECEMBER.		Gauge surface 5 in. above the ground.														
SUNDAY ..	19	Inches. 0.00	5.3	strong Positive generally; mod. Negative occasionally.			0.6	7.7	Fine generally; partially cloudy. A slight shower of rain fell shortly before 11h. A.M. Overcast. Rain fell heavily in morning, and sleet and snow fell in afternoon.							
MONDAY ..	20	0.78	0.0	mod. Positive till noon; strong Negative till 4h. P.M.; mod. Posi- tive afterwards. variable Positive throughout ..			0.0	7.7								
TUESDAY ..	21	0.00	0.0	mod. Positive till 6h. A.M.; weak Negative till 1h. P.M.; weak Posi- tive afterwards.			0.0	7.7	Generally cloudy till afternoon, fine afterwards. Fog and hoar frost at night. Overcast. Rain fell during the greater part of the day.							
WEDNESDAY	22	0.44	1.7	weak Positive generally			0.0	7.7								
THURSDAY ..	23	0.01	7.0	weak Positive generally			1.6	7.7	Partially cloudy and fine till about 2h. P.M.; generally overcast afterwards. Occasional rain at night.							
FRIDAY ..	24	0.03	5.3	weak Positive in morning; mod. Positive afterwards except be- tween 4h. and 5h. P.M., when mod. Negative was shown.			2.8	7.7	Rain in morning; partially cloudy and generally fine afterwards. A shower of rain between 4h. and 5h. P.M.							
SATURDAY ..	25	0.00	0.0	strong Positive throughout ..			4.4	7.7	Hour frost in morning. A very fine day; the amount of cloud was small till even- ing; cloudless at night.							
MEANS ..		Sum 1.26	2.8				Sum 9.4	Sum 53.9								

METEOROLOGICAL OBSERVATIONS taken at the ROYAL OBSERVATORY, GREENWICH, during the Week ending Saturday, 1st JANUARY, 1881.  
 [Under the Superintendence of the Astronomer Royal.]

1880-81. MONTH. AND DAY.		READINGS OF THERMOMETERS.				DIFFERENCE.			WIND. As deduced from Anemometers.					
		BARO-METER.		Dry.		Dew Point.		Between Dew Point and Air Temperature.		Osler's.		Robinson's.		
Phases of Moon		Mean daily reading (corrected and reduced).		High-est.	Low-est.	Range in day.	Mean daily value.	Mean daily value.	Great-est.	Least.	General Direction.	Pressure on square foot.	Horizontal Movement of Air each day.	Departure from Average.
		ins.												
DECEMBER.														
SUN. ..	26	—	29.496	37.1	30.0	2.1	34.3	29.3	7.0	1.5	SW. & WSW.	SW. ESE. & SE.	1.2	0.0
MON. ...	27	—	29.251	51.4	32.9	18.5	42.2	41.8	2.1	0.0	SE. E. & SW.	NE. & SW.	4.0	0.0
TUES. ...	28	—	29.428	53.5	49.3	4.2	51.3	48.7	4.0	1.8	SSW.	SSW.	3.0	0.1
WED. ...	29	—	29.121	50.7	41.0	9.7	47.5	45.0	4.5	0.0	SSW. & S.	S. & WSW.	14.5	0.0
THURS. 30		Greatest	29.289	42.6	33.1	9.5	36.7	34.7	5.0	0.0	WSW. & SW.	N. & NW.	9.0	0.6
FRI. ..	31	Dec. S. New Perigee.	29.997	35.1	32.1	3.0	34.0	30.4	5.2	1.5	W. & NNW.	NNW. WNW. & WSW.	2.0	0.1
JANUARY.														
SAT. ..	1	—	30.177	42.2	32.0	10.2	37.9	36.0	3.5	0.0	WSW.	SW. & WSW.	0.0	0.0
MEANS ..		—	29.537	44.7	35.8	8.9	40.6	38.0	4.5	0.7	SW.		—	—
DATE.		RAIN.		Ozone.		ELECTRICITY.		Registered Sunshine, in hours.		Sun above Horizon, in hours.		SKY AND ATMOSPHERE.		
DECEMBER.		Gauge surface 5 in. above the ground.												
SUNDAY ..	26	Inches. 0.00		0.0		strong Positive throughout ..		0.2		7.8		Fine and partially cloudy till evening; overcast at night. Hoar frost. ; Overcast generally; foggy. Sleet and rain fell in morning; and rain fell heavily at night.		
MONDAY ..	27	0.36		1.3		weak Negative in early morning; variable Positive generally afterwards.		0.4		7.8		Cloudy and showery till evening; fine at night. Overcast; showery.		
TUESDAY ..	28	0.07		5.5		weak Positive throughout ..		0.0		7.8		Rain fell in morning; overcast till afternoon; fine with thin cloud afterwards.		
WEDNESDAY	29	0.24		12.5		weak Negative and weak Positive in afternoon and evening.		0.0		7.8		Snow fell in morning; fine afternoon; at night the sky was cloudless.		
THURSDAY..	30	0.17		6.7		mod. Positive till 6h. A.M.; strong Negative till 9h. A.M.; strong Positive afterwards.		0.0		7.8		Overcast generally.		
FRIDAY ..	31	0.12		0.0		strong Positive shown throughout, except between 3h. A.M. and 4h. A.M. when strong Negative was shown.		0.5		7.8				
JANUARY.														
SATURDAY ..	1	0.00		4.0		strong Positive throughout ..		0.0		7.9				



1881. MONTH AND DAY.		MOON.	READINGS OF THERMOMETERS.				DIFFERENCE.				WIND. As deduced from Anemometers.				Robinson's. Horizontal Movement of Air each day.		Departure from Average.					
			BARO- METER.	Dry.		Dew Point.	High- est	Low- est	Between Dew Point and Air Temperature.		From average of 20 years.	General Direction.		Pressure on square foot.								
				Mean daily reading (cor- rected and re- duced).	High- est.				Low- est.	Range in day.		Mean daily value.	Mean daily value.	Great- est.				Least.	A.M.	P.M.	Great- est.	Least.
JANUARY.			in.																			
SUN. ..	2	—	30.238	43.1	40.8	2.3	42.1	40.3	41.2	38.0	1.8	3.3	0.0	0.0	0.0	0.0	68	—245				
MON. ..	3	—	30.181	43.4	38.0	5.4	40.7	36.8	52.8	30.8	3.9	6.2	2.0	0.0	0.0	0.0	107	—208				
TUES. ..	4	—	30.079	41.6	35.3	6.3	38.9	35.9	46.4	30.3	3.0	4.8	1.0	0.0	0.0	0.0	197	—119				
WED. ..	5	In	30.084	43.1	35.7	7.7	39.5	35.6	65.3	30.9	3.9	6.8	0.0	0.0	0.0	1.0	517	+200				
THURS. ..	6	Equator.	30.266	41.1	33.8	7.3	37.2	31.2	68.3	29.6	6.0	9.0	3.0	0.0	0.0	0.0	571	+254				
FRI. ..	7	First Quarter.	30.406	41.4	30.8	10.6	35.8	31.8	76.8	25.4	4.0	6.7	1.5	0.0	0.0	0.0	295	—23				
SAT. ..	8	—	33.336	38.4	30.2	8.2	34.6	30.6	50.9	25.6	4.0	6.0	1.0	0.0	0.0	0.0	267	—51				
MEANS ..		—	30.227	41.8	34.9	6.8	38.4	34.6	57.8	30.1	3.8	6.1	1.2	0.0	0.0	0.0	Sum 2022	—192				
DATE.			RAIN.		Ozone.		ELECTRICITY.				Registered Sunshine, in hours.		Sun above Horizon, in hours.		SKY AND ATMOSPHERE.				NOTE.—For explanation of any point that may not be readily intelli- gible, see last page of the Registrar General's Weekly Returns.			
JANUARY.			Gauge surface 5 in. above the ground.																			
SUNDAY ..	2	Inches. 0.00	0.0		mod. Positive generally .. weak Positive in morning; strong Positive afterwards. strong Positive throughout.		0.0		7.9		Overcast. Foggy at times. Overcast and foggy in morning; fine and partially cloudy afterwards. Generally overcast till evening; cloud- less at night.											
MONDAY ..	3	0.00	0.0				0.3		7.9													
TUESDAY ..	4	0.00	0.0				0.0		7.9													
WEDNESDAY ..	5	0.00	5.8		weak Positive in morning; strong Positive afterwards.		2.1		7.9		Partially clouded till afternoon; cloud- less in evening.											
THURSDAY ..	6	0.00	2.2		weak Positive in morning; strong Positive afterwards.		5.4		8.0		A very fine day: light clouds prevailed.											
FRIDAY ..	7	0.00	2.2		strong Positive throughout ..		5.7		8.0		A very fine day: cloudless throughout. Hoar frost.											
SATURDAY ..	8	0.00	6.8		strong Positive generally: a little weak Negative at night.		0.0		8.0		Cloudy throughout.											
MEANS ..		Sum 0.00	2.4				Sum 13.5		Sum 55.6													

METEOROLOGICAL OBSERVATIONS taken at the ROYAL OBSERVATORY, GREENWICH, during the Week ending Saturday, 15th JANUARY, 1881.  
[ Under the Superintendence of the Astronomer Royal.]

1881. MONTH AND DAY.		MOON.	BARO- METER.	READINGS OF THERMOMETERS.										DIFFERENCE.				WIND. As deduced from Anemometers.						
				Dry.				Dew Point.	High- est	Low- est	Between Dew Point and Air Temperature.		From average of 20 years.	Satura- tion = 100.	Osler's.		Pressure on square foot.		Horizontal Movement of Air each day.	Departure from Average.				
				High- est.	Low- est.	Range in day.	Mean daily value.				Mean daily value.	Least.			General Direction.	Great- est.	Least.	Mean of 24 Obs.						
JANUARY.	SUN. .. 9	—	in. 30.123 29.832	38.5 34.2	33.0 33.0	35.4 33.7	32.1 28.3	61.4 38.5	30.7 29.6	3.3 5.4	5.8 8.4	1.0 2.5	2.3 4.1	88 80	NNE. NNE. & N.	NNE. W. NN.W. & N.	0.6 0.2	0.0 0.0	0.0 0.0	0.0 0.0	221 170	Miles. Miles.	— 97 — 149	
TUES. 11	—	—	29.584 29.318	34.1 31.7	30.5 23.0	32.2 27.8	27.6 19.4	36.4 47.8	29.5 20.0	4.6 8.4	7.8 10.3	3.0 4.5	5.7 10.3	83 69	NNW. SW. NNW. & W.	W. & SW. WSW.	0.0 1.0	0.0 0.0	0.0 0.0	0.0 0.0	175 278	Miles. Miles.	— 144 — 42	
THURS. 13	—	Greatest Dec. N.	29.423 29.668 29.598	32.8 25.3 24.8	19.5 15.0 14.0	27.3 20.3 19.6	23.5 19.9 14.7	41.2 35.2 41.8	18.8 14.0 12.6	3.8 0.4 4.9	5.0 1.8 8.4	1.0 0.0 0.5	10.9 18.0 18.8	85 98 81	WSW. & NNW. N. & NE. SW. & WSW.	N. NW. & S.W. WSW. & SW.	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	225 95 158	Miles. Miles.	— 96 — 227 — 166	
MEANS ..	..	..	29.649	31.6	24.0	28.0	23.6	43.2	22.2	4.4	6.8	1.8	10.0	83	Variable.		—	—	—	—	Sum 1322	Sum — 921		
DATE.		RAIN.	Ozone.		ELECTRICITY.										Registered Sunshine, in hours.	Sun above Horizon, in hours.	SKY AND ATMOSPHERE.		NOTE.—For explanation of any point that may not be readily intelli- gible, see last page of the Registrar General's Weekly Returns.					
JANUARY.		Gauge surface 5 in. above the ground.																						
SUNDAY ..	9	Inches. 0.00 0.00	0.0	0.0	strong Positive throughout .. strong Positive in morning ; variable Positive till evening ; strong Positive at night. strong Positive generally ..										0.4 0.0	8.1 8.1	Fine : generally cloudy. Overcast : cloudy in morning and after- noon ; a little thin rain in evening.							
TUESDAY ..	11	0.00	0.0	0.0	strong Positive till 6h. A.M. ; variable Negative and variable Positive till 10h. A.M. ; strong Positive afterwards. Loss of record till 9h. A.M. and after 6h. P.M. through the freezing of the discharge pipe ; mod. Posi- tive shown between 9h. A.M. and 6h. P.M.										0.0	8.1	Overcast : gloomy at times ; occasional snow. Snow fell thickly in early morning hours ; fine and bright during remainder of day.							
WEDNESDAY	12	0.13	0.0	0.0											2.2	8.2								
THURSDAY ..	13	0.00	0.0	0.0											0.0	8.2	Cloudy and very gloomy till afternoon ; fine afterwards. Generally cloudless at night ; hoar frost.							
FRIDAY ..	14	0.00	0.0	0.0											0.0	8.2	Cloudy till evening : cloudless at night. Dense fog at times ; hoar frost.							
SATURDAY ..	15	0.00	0.0	0.0											1.2	8.3	A fine day : the amount of cloud was small throughout. Hoar frost.							

NOTE.—For explanation of any point that may not be readily intelligible, see last page of the Registrar General's Weekly Returns.



1881. MONTH AND DAY.		MOON.  Phases of Moon.	READINGS OF THERMOMETERS.					DIFFERENCE.			Saturation- Humidity: Hutton = 100.	WIND. As deduced from Anemometers.				Robinson's, Horizontal Movement of Air each day.	Departure from Average.			
			BARO- METER.  Mean daily reading (cor- rected and re- duced).	Dry.			Dew Point.  Mean daily value.	High- est in the Sun.	Low- est on the Grass.	Between Dew Point and Air Temperature.		Least. of 20 years.	General Direction.		Pressure on square foot.					
High- est.	Low- est.	Range in day.		Mean daily value.	Mean daily value.	Great- est.				A.M.	P.M.		Greatest.	Least.	Mean of 24 Obs.	Miles.	Miles.			
JANUARY.			in.																	
SUN. ..	16	—	29.633	24.6	17.7	6.9	20.6	15.8	34.1	13.5	8.1	9.2	8.3	WSW.	SSW. S. & E.	S.W.	0.0	0.0	123	
MON. ..	17	—	29.576	31.1	12.7	18.4	23.2	13.1	59.8	11.3	16.8	3.5	8.3	E.	E. & E.N.E.	E.	10.0	0.0	233	
TUES. ..	18	—	29.004	30.4	26.2	4.2	27.9	25.8	32.1	24.8	2.1	0.0	0.0	ENE. & N.E.	ENE.	ENE.	51.5	0.5	860	
WED. ..	19	In Equator.	29.103	29.7	25.5	4.2	27.2	23.3	31.7	25.0	3.9	2.8	2.8	ENE. & N.E.	ENE. & N.	NNE. & N.	7.0	0.0	566	
THURS. ..	20	—	29.726	25.5	14.4	11.1	19.2	12.6	32.4	10.2	6.6	2.0	19.9	NNW. & WSW.	NNW. & WSW.	SW. SE. & E.	3.5	0.0	215	
FRI. ..	21	—	30.066	29.2	15.8	13.4	22.3	18.5	83.0	10.7	9.2	0.0	17.0	ENE.	E. & N.E.	E. & N.E.	1.2	0.0	221	
SAT. ..	22	—	30.000	31.7	17.3	14.4	23.7	16.9	31.7	12.0	7.9	0.0	15.8	NNE. N. & WSW.	NNE. N. & WSW.	WSW. & N.	1.0	0.0	152	
MEANS ..			29.590	28.9	18.5	10.4	23.4	18.6	43.5	15.4	4.9	9.8	1.4	15.5	Variable.	Variable.	Variable.	—	—	Sum 2450
DATE.			RAIN.		Ozone.		ELECTRICITY.			Registered Sunshine, in hours.		Sun above Horizon, in hours.		SKY AND ATMOSPHERE.						
JANUARY.			Gauge surface 5 in. above the ground.																	
SUNDAY ..	16	Inches. 0.00	0.00	0.0	In consequence of the frost the electrometer was not in action throughout the week.			8.3	0.0	0.0	8.3	Cloudless: foggy till evening; hoar frost. Dense fog prevailed in morning; fine with light clouds till afternoon, and solar halo was observed; generally overcast at night. Overcast. Heavy snow-storm from 9h. A.M., and violent gale throughout. Deep snow-drifts. Overcast. Frequent snow. Partially cloudy and foggy till evening; cloudless at night. A very fine bright day. Generally cloudless till evening; cloudy at night. Cloudy throughout. Slight snow in morning. Fog prevailed generally till evening. Large masses of ice in the River Thames.								
MONDAY ..	17	0.00	2.0	2.0				8.3	1.1	1.1	8.3									
TUESDAY ..	18	0.35	6.5	6.5	8.4	0.0	0.0	8.4	0.0	0.0	0.0	8.4	8.5	8.5	8.6	8.6	8.6	8.6	8.6	
WEDNESDAY ..	19	0.11	1.5	1.5	8.5	5.8	5.8	8.5	5.8	5.8	5.8	8.5	8.5	8.5	8.6	8.6	8.6	8.6	8.6	
THURSDAY ..	20	0.00	0.0	0.0	8.6	0.0	0.0	8.6	0.0	0.0	0.0	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	
FRIDAY ..	21	0.00	0.0	0.0	8.6	0.0	0.0	8.6	0.0	0.0	0.0	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	
SATURDAY ..	22	0.00	0.0	0.0	8.6	0.0	0.0	8.6	0.0	0.0	0.0	8.6	8.6	8.6	8.6	8.6	8.6	8.6	8.6	
MEANS ..			Sum 0.46	1.4	1.4	Sum 6.9	Sum 59.0	Sum 59.0	Sum 6.9	Sum 59.0	Sum 6.9	Sum 59.0	Sum 59.0	Sum 59.0	Sum 59.0	Sum 59.0	Sum 59.0	Sum 59.0	Sum 59.0	Sum 59.0

METEOROLOGICAL OBSERVATIONS taken at the ROYAL OBSERVATORY, GREENWICH, during the Week ending Saturday, 29th JANUARY, 1881.  
[ Under the Superintendence of the Astronomer Royal. ]

1881. MONTH AND DAY.	MOON.  Phases of Moon.	READINGS OF THERMOMETERS.										DIFFERENCE.			Saturation = 100. Humidity.	WIND. As deduced from Anemometers.				Horizontal Movement of Air each day.	Departure from Average.
		BARO- METER.	Dry.					Dew Point.	High- est in the Sun.	Low- est on the Grass.	Between Dew Point and Air Temperature.		Average of 20 years.	General Direction.		Pressure on square foot.					
			High- est.	Low- est.	Range in day.	Mean daily value.	Mean daily value.				Great- est.	Least.		Mean of 24 Obs.							
																A.M.	P.M.	Great- est.	Least.		
JANUARY.		in.																	Miles.	Miles.	
SUN. .. 23	Last Qr.	30.042	35.1	30.0	9.1	32.3	27.1	41.6	24.0	8.5	2.0	9.3	0.0	0.0	0.0	0.0	0.0	156	-177		
MON. .. 24	—	30.075	30.0	23.3	6.7	25.4	24.8	36.3	21.2	4.3	0.0	14.3	0.0	0.0	0.0	0.0	0.0	73	-261		
TUES. .. 25	—	29.779	31.2	16.8	14.4	23.5	17.8	78.8	15.5	11.1	1.7	16.3	0.0	0.0	0.0	0.0	0.0	249	-86		
WED. .. 26	Greatest Dec. S.	29.420	35.3	13.2	22.1	23.5	22.1	36.1	11.5	6.5	0.0	16.4	0.0	0.0	0.0	0.0	0.0	135	-200		
THURS. .. 27	—	29.098	43.3	35.3	8.0	39.3	39.1	58.2	31.9	0.5	0.0	0.7	0.0	0.0	0.0	0.0	0.0	190	-146		
FRI. .. 28	—	28.979	42.1	34.9	7.2	37.9	37.7	51.0	34.0	1.4	0.0	2.2	0.0	0.0	0.0	0.0	0.0	206	-130		
SAT. .. 29	Perigee	28.768	43.1	42.1	6.0	45.3	44.2	54.9	37.0	2.5	0.0	5.1	0.0	0.0	0.0	0.0	0.7	392	+ 55		
MEANS ..	—	29.452	37.9	27.9	9.9	32.5	30.4	51.0	25.0	2.1	5.0	7.4	0.5	—	—	—	—	Sum 1401	Sum -945		
DATE.		RAIN.		Ozone.		ELECTRICITY.				Registered Sunshine, in hours.		Sun above Horizon, in hours.		SKY AND ATMOSPHERE.				—			
JANUARY.		Gauge surface 5 in. above the ground.																			
SUNDAY .. 23		Inches, 0.00		0.0						0.0		8.6		Overcast : a little snow fell during the morning.				NOTE.—For explanation of any point that may not be readily intelligible, see last page of the Registrar General's Weekly Returns.			
MONDAY .. 24		0.00		0.0						0.0		8.7		Overcast : fog and hoar frost.							
TUESDAY .. 25		0.00		3.0						2.1		8.7		A very fine day : partially cloudy till evening : cloudless at night.							
WEDNESDAY .. 26		0.12		1.0						0.0		8.8		Generally cloudy in morning ; overcast after noon. Snow and sleet fell between 7h. and 9h. P.M. and rain fell afterwards.							
THURSDAY .. 27		0.07		0.0						0.0		8.8		Overcast, fog. Rain fell occasionally.							
FRIDAY .. 28		0.08		1.5						0.0		8.9		Cloudy : foggy in morning. Occasional rain.							
SATURDAY .. 29		0.22		5.3						0.0		8.9		Overcast : frequent rain.							
MEANS ..	..	Sum 0.49		1.5						Sum 2.1		Sum 61.4									

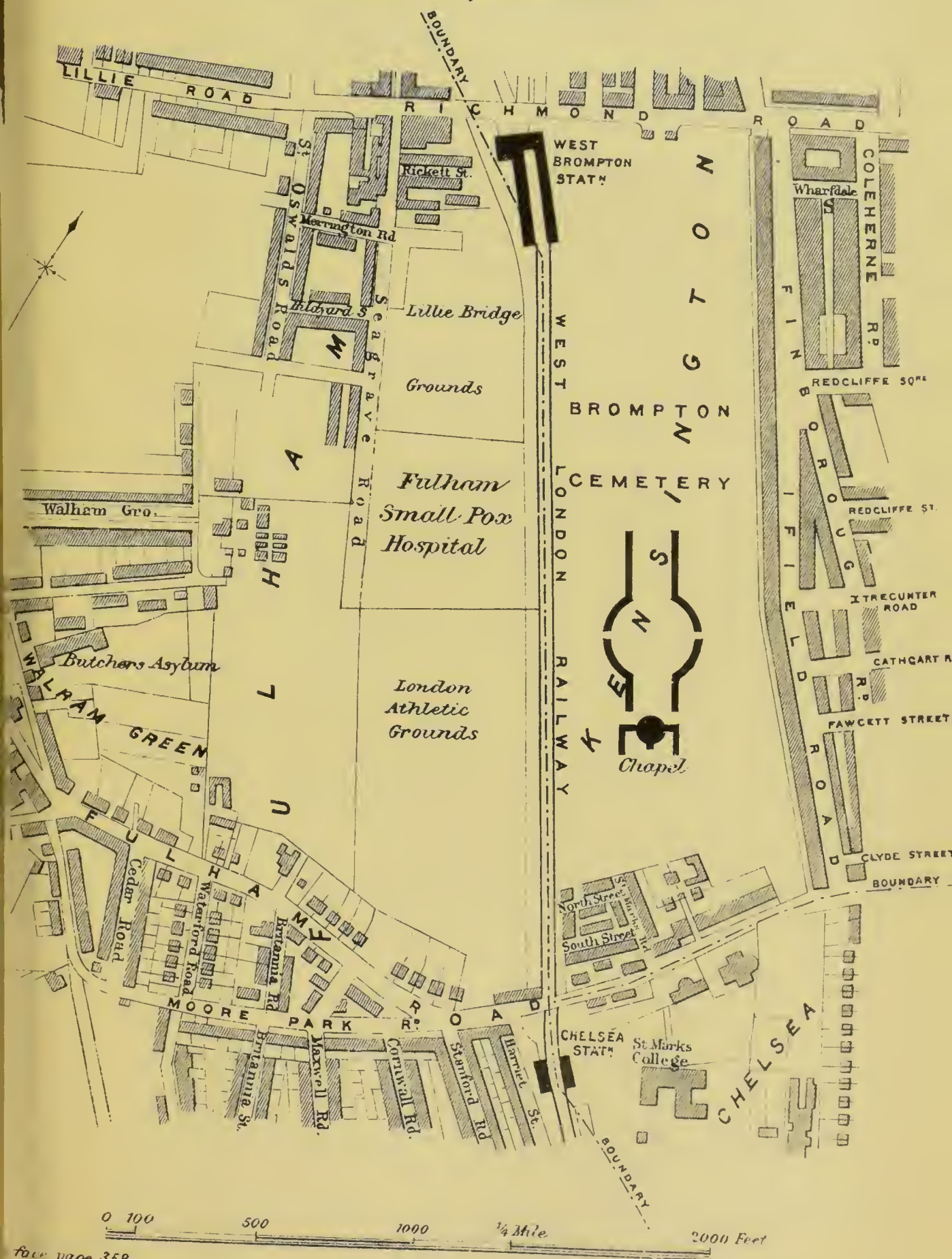


# PARTS OF KENSINGTON FULHAM & CHELSEA.

## ADJACENT TO SMALL POX HOSPITAL.

*From D<sup>r</sup> Dadfields Annual Report for 1879.*

*Reproduced by permission.*

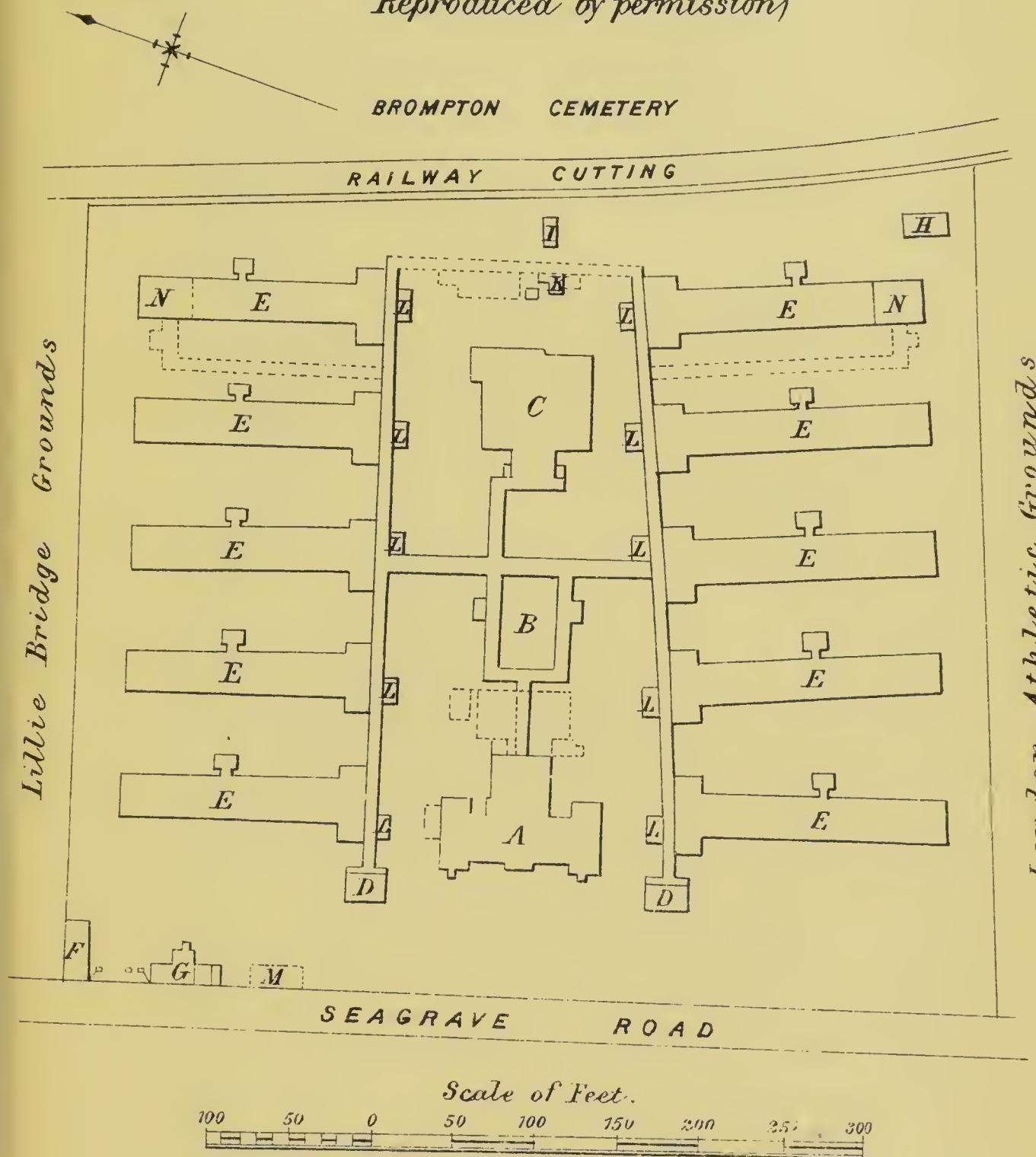






# BLOCK PLAN, FULHAM HOSPITAL.

(From Dr. Dudfields Annual Report for 1879,  
Reproduced by permission)



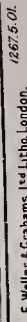
## References.

- |                                 |                                       |
|---------------------------------|---------------------------------------|
| A. Administrative.              | G. Gate Porters Lodge.                |
| B. Kitchen.                     | H. Mortuary.                          |
| C. Laundry.                     | I. Patients Clothes Store.            |
| D. Receiving Wards.             | K. Disinfecting Room.                 |
| E. Wards                        | L. Coals & Dust.                      |
| F. Waiting Room.                | M. Stores Reception Room. (intended). |
| N. Separation Ward. (intended). |                                       |





МАР. В



Scale  $2\frac{1}{2}$  Inches to a Mile

①

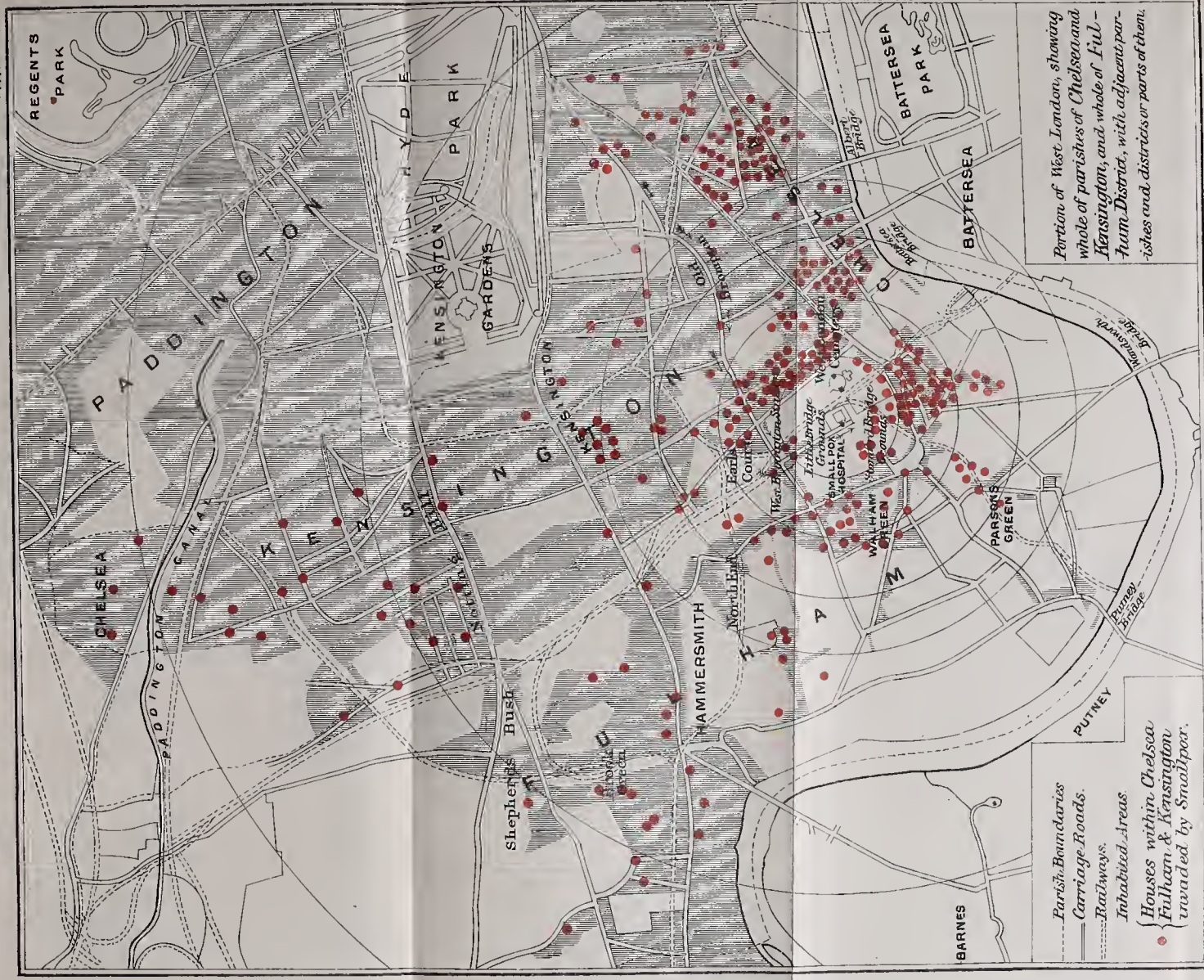




EPI DEMIC-PERIOD 1878-79.

(SEPT<sup>R</sup>-78 SEPT<sup>R</sup>79.)

M.A.P. C.



- *Partish Boundaries*  
 = *Carriage Roads*.  
 --- *Railways*.  
*Inhabited Areas*.  
 { *Houses within Chelsea*  
*Fulham & Kensington*  
*invaded by Smallpox.*

*Portion of West London, showing whole of parishes of Chelsea and Kensington, and whole of Fulham District, with adjacent parishes and districts or parts of them.*

To face page 358.

Scale, 2 Inches to a Mile

E. Weller & Grahams, Ltd. Litho. London.

12675.01.

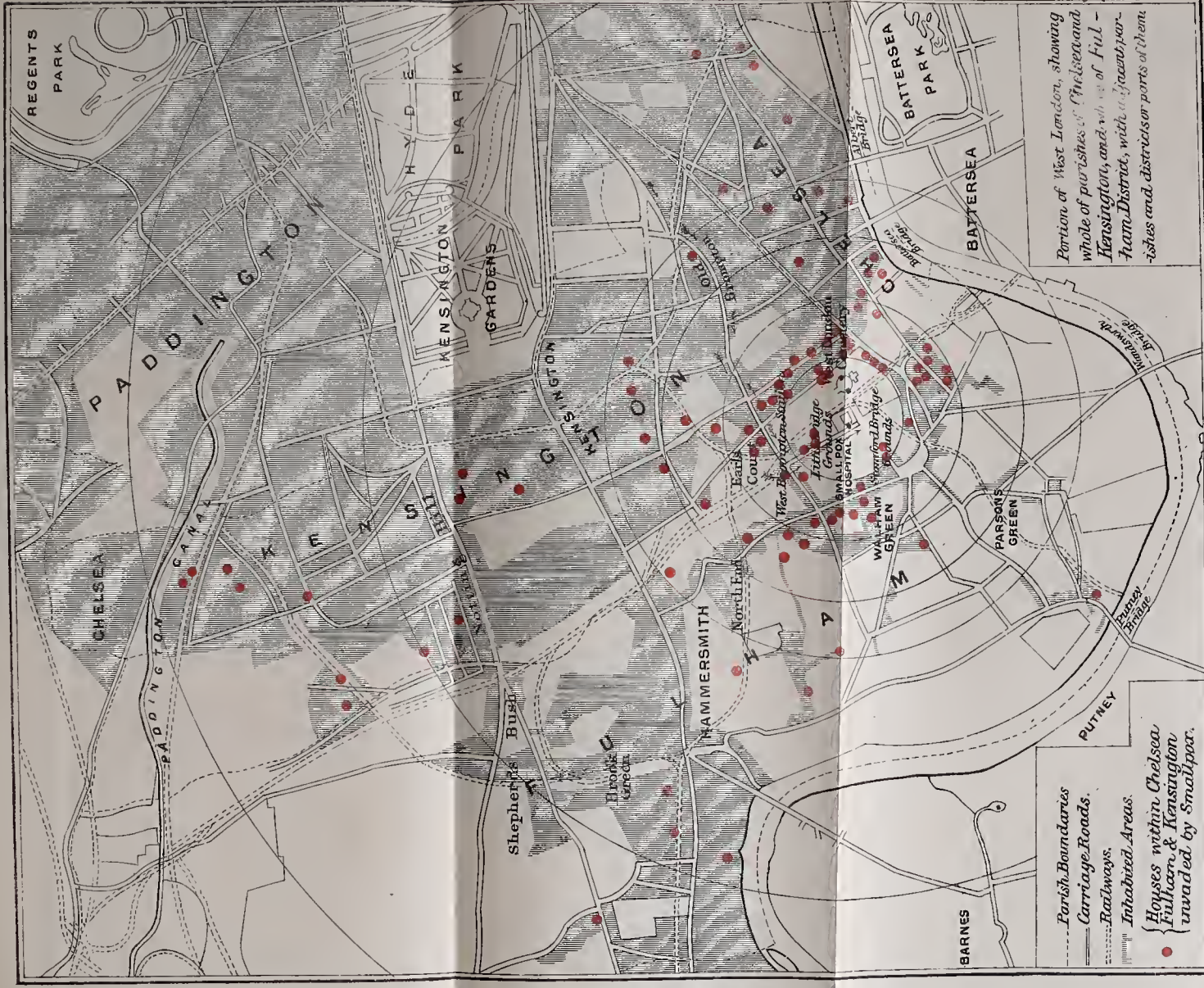












*To face page 358*

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## No. 3.

APP. No. 3.

Official  
MemorandumON THE PROVISION OF ISOLATION HOSPITAL ACCOMMODATION BY  
LOCAL AUTHORITIES.

This memorandum is designed to represent to those who are responsible for the health of communities the importance of providing hospital accommodation for the isolation of cases of infectious disease, and of doing so before the actual invasion of their districts by such disease. It is further intended to indicate to local authorities, more especially to those of districts of small or moderate size, the means by which they may most advantageously make such provision. Some general principles to be held in view by all authorities who propose to provide by means of loans sanctioned by the Local Government Board, isolation hospitals for their districts will be set forth in the course of the memorandum. Those in italics are points which the Board regard as indispensable.

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The provision of hospital accommodation for cases of infectious diseases is to be regarded primarily as a measure of sanitary defence, for the protection of the public against the spread of these diseases. It is true that such accommodation incidentally serves other useful purposes. Thus, it is frequently of value for the relief of individuals suffering from infectious disease, whose sufferings may be alleviated and their recovery promoted by affording them better accommodation and attendance than they are able to obtain at their own homes. Or it may be the means of avoiding serious inconvenience and pecuniary loss, as when infectious disease breaks out in a school, a lodging house, or a place of business. But, nevertheless, the most important function which such a hospital serves is that of the isolation of the first cases of infectious disease with a view to preventing its further spread in the household or locality invaded.

In order that a hospital may fulfil this function it is essential that it should be in readiness beforehand. Experience has shown that on the invasion of an epidemic, a hospital, even of a temporary kind, can seldom be provided and got ready for use until the time when it would have been of most service is past. The accommodation, moreover, which is required when an epidemic has become established is on a larger scale than would have sufficed for the isolation of the first cases; and hospitals hurriedly erected during the stress of an epidemic are never satisfactory in construction or suited to the permanent needs of the district.

An isolation hospital being intended primarily for the protection of the public at large rather than for the benefit of individuals, it is undesirable that admission should be subject to restrictive charges and conditions which may tend to prevent the use of the hospital by the poorer portion of the community; that is to say, by those who have the

least facilities for isolation and treatment at their own homes. In some districts, however, *e.g.*, at health resorts, it may be advisable to provide special accommodation of a superior kind, such as private wards, for persons willing to pay for it.

*Area to be served by a hospital.*—The extent of area for which an isolation hospital may serve will depend in some degree upon considerations of local topography. If the area be too large the usefulness of the hospital will be diminished, owing to the difficulties attending the conveyance of patients over long distances. But, on the other hand, the unnecessary multiplication of small hospitals is to be avoided on grounds both of economy and of efficiency. As compared with that of several smaller hospitals, the establishment of a single hospital containing an equal number of beds saves the cost of duplicating various buildings, appliances and officers; it facilitates the classification of patients according to the diseases from which they are suffering; and it enables a more efficient staff to be maintained, since the hospital is less likely to remain empty for considerable periods. Hence, where districts are not very large or populous, combination for the purpose of providing hospital accommodation is often of advantage. In the less densely populated parts of the country, a market town with the surrounding rural district, or the several sanitary districts comprised in one poor law union, may form a convenient area for the purpose of combined hospital provision. A hospital intended solely for small-pox may serve a larger area than a hospital for other infectious diseases. The modes by which local authorities may combine for the provision of hospitals are set forth in an office memorandum on "Isolation Hospitals," which may be obtained on application, for the guidance of local authorities desirous of such combination or of establishing hospitals under the sanction of the Local Government Board.

*Size of Hospital in proportion to population.*—The amount of permanent isolation hospital accommodation which should be provided in proportion to the population will depend upon various considerations, among the most important of which are the character of the district, whether urban or rural; the rate of increase of population; the housing and the habits of the people; and the amount of intercourse with other places from which infectious disease may be introduced. As a rough estimate, one bed for every thousand inhabitants is sometimes adopted, but in view of the diverse circumstances of different districts this cannot be regarded as a definite standard. Moreover, the sufficiency of the hospital accommodation will depend not merely upon the aggregate number of beds, but also upon the way in which they are arranged in wards. In a single block with wards connected together only one disease can safely be treated at a time; and thus, at a hospital containing only one such block, occasions may arise when, owing to the hospital being partly occupied by one disease, a case of a second disease requiring isolation cannot safely be taken in, although there may be a number of beds empty at the time.

It is common to find that the demand for hospital accommodation, when people have come to appreciate the benefits of its use, increases far beyond what was at first anticipated; and for this reason, as well as to allow for growth of the population and for the possible need for temporary extensions during epidemics, it is well at the outset to provide for the contingency of future enlargement.

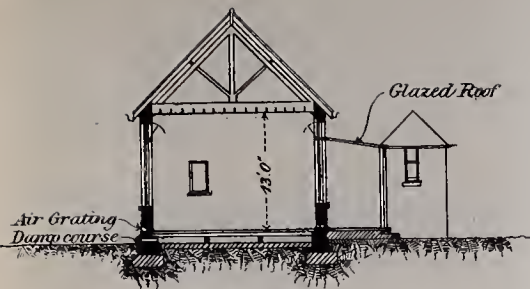
*Site.*—In selecting a site for an isolation hospital the following considerations should be had in view:—It should be convenient of access,







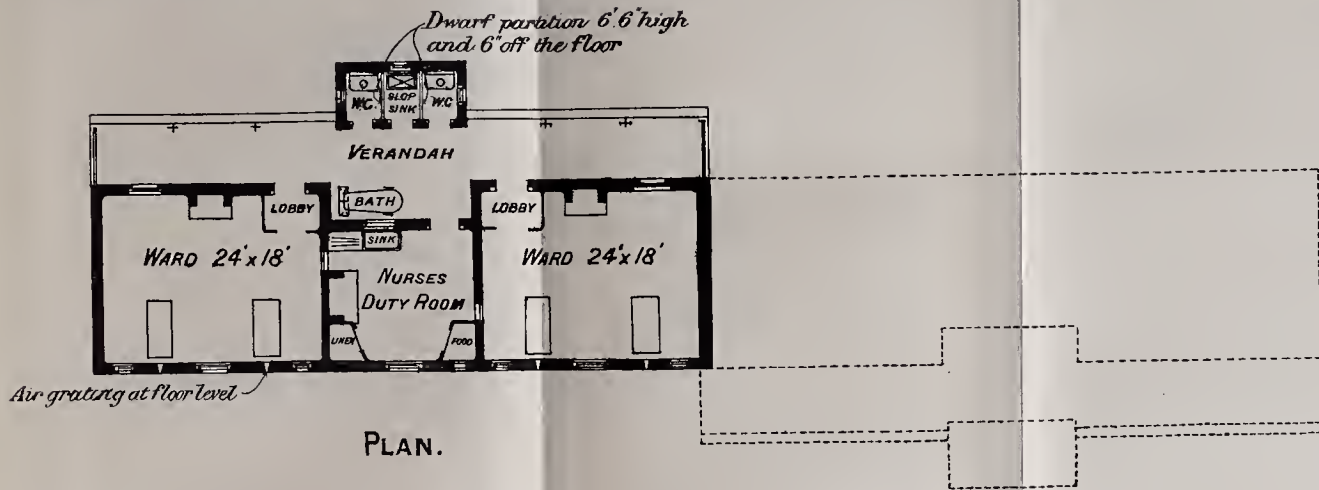




SECTION.

NOTES.

*In a double block on this pattern the entrances and verandahs should be on alternate sides as here illustrated. If the verandahs are enclosed it should be only by a movable screen so arranged that it can be taken away altogether as circumstances require.*



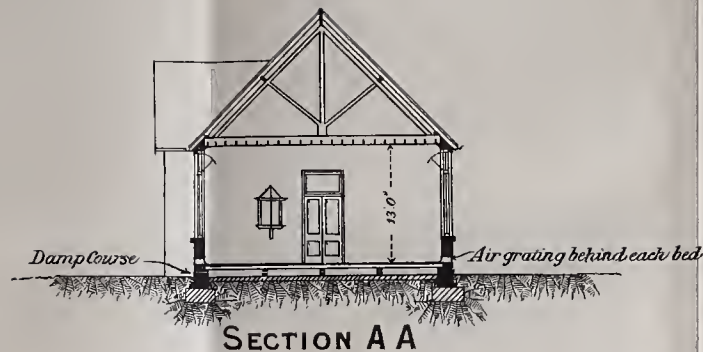
PLAN.

*Scale; 16 feet to One Inch.*

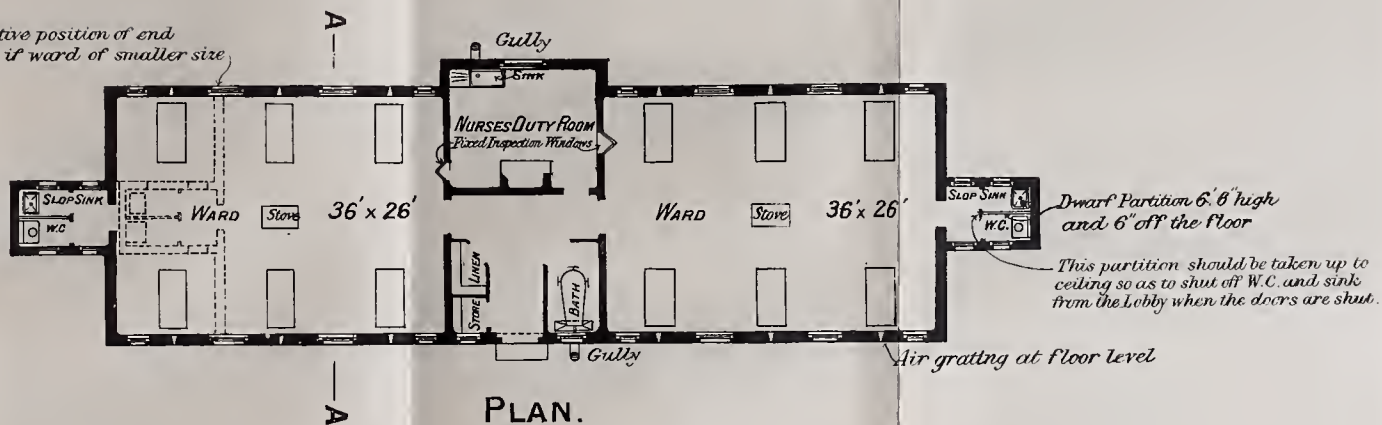
B







*Alternative position of end wall, &c., if ward of smaller size*



*Scale, 16 feet to One Inch.*





and, as far as practicable, central for the population and area which it is to serve; but of course not in a very populous neighbourhood. (In the case of hospitals in which small-pox is intended to be received the choice of site must be specially governed by considerations as to the number of inhabitants in the neighbourhood, which will be referred to later on.) It will be of much convenience if sewers and a public water service are available; but, if not, a sufficient supply of wholesome water must be provided, and arrangements will have to be made for the treatment of the sewage by application to land, due care being taken to avoid pollution of any well or spring or of any river. The site should be in a healthy and open situation with a dry subsoil, and should be preferably of a compact and regular shape, and not too steep. Its area will depend upon the size of the hospital, and, except in the case of a very small hospital, should rarely be less than two acres; indeed it is well to obtain a larger site than may at first be required, in order to afford space for subsequent extension if necessary. More land, too, will be needed if the sewage has to be disposed of on the site. *The site, or so much of it as is to form the grounds of the hospital, should be enclosed by a wall or close fence at least 6 feet 6 inches in height, and every building which is to contain infected persons or things should be at least 40 feet distant from the boundary.\**

*Hospital buildings.*—These should be of three classes, viz.: 1st, ward-blocks for the reception of the sick; 2nd, administration-block for the housing of the staff and stores; and 3rd, out-offices, as laundry and mortuary. In hospitals for permanent use these buildings should be of brick or stone. Temporary buildings, as, for instance, buildings constructed of wood or corrugated iron, are ill suited for permanent use as hospitals, for the reason that it is difficult to maintain them at a proper temperature during extremes of hot and cold weather; moreover they are less durable than brick or stone buildings, requiring more frequent repairs in order to keep them in a properly weather-proof condition, and they are liable to be destroyed by fire and storm. *It is not the practice of the Local Government Board in ordinary cases to sanction loans for iron hospitals or for hospital buildings of temporary character.*

Existing buildings originally designed for a different purpose such as dwelling houses, even when of large size, are rarely found to be well adapted for the reception of patients; especially for the accommodation at one time of patients suffering from different infectious diseases. An existing house, however, may sometimes serve as the administration-block, if it have sufficient land attached on which to erect ward-blocks.

The *administration-block*, which should be kept free from patients and infected articles, should be so placed as to control the entrance to the hospital grounds, unless a porter's lodge is intended to be erected. It should contain quarters for the matron or caretaker, and a sufficient number of bed-rooms for the nurses and servants who will be required to work the hospital when in full operation; also a nurses' sitting room; a kitchen (preferably in a one-storey projection with top ventilation), store-rooms, dispensary, &c. In hospitals of considerable size quarters for a resident medical officer will also be necessary. It is well to provide

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\* If desired, an open unclimbable railing may be substituted for a wall or close fence for so much of the boundary as is within supervision and control from the administration block or porter's lodge, as between the points X-X on the annexed block plan A, but in that case a second line of unclimbable fence should be constructed within the first, as indicated on the plan.

in the administration-block accommodation on a scale somewhat in excess of what may be at first required, in order that it may be available for future extensions of the hospital, temporary or permanent; but in any case the block should be so planned that it can be easily enlarged in the future if necessary.

The *ward-blocks* should be one-storey buildings, unless where in exceptional cases or at large hospitals exigencies of space may render it necessary to construct blocks of two storeys; in such case each storey should have a separate entrance from the open air. The annexed plans illustrate two different types of ward-block suitable for small or moderate sized hospitals. The type illustrated in plan C is the most advantageous, as regards both cost of construction and convenience of administration, where a number of patients of both sexes suffering from the same disease have to be treated at one time. The number of beds in each ward will vary with the requirements of the district, and it is sometimes found desirable to make one ward rather larger than the other, as indicated on the plan, in order that young children of both sexes may be treated in the women's ward.

Plan B shows a ward-block with small wards separately entered from the open air under a verandah. Accommodation of this kind is useful not only for cases of a second disease, but also under a variety of circumstances, as for the keeping under observation of a case of doubtful nature; for the segregation of a complicated, noisy, or offensive case; or as private wards for paying patients, &c.

For very large hospitals other types of ward may be found of advantage.

*In the ward-blocks each bed must have at least 12 linear feet of wall space, 144 square feet of floor space, and 2,000 cubic feet of air space.* In calculating the latter any height of wards above 13 feet should not be taken into account. The walls should be of adequate thickness; and the inner face of the walls as well as the floors and woodwork should be constructed with smooth impervious surfaces and rounded angles, so as to facilitate cleanliness and to avoid spaces which may harbour dust and dirt. Ventilation should be by windows on opposite sides of the ward; the windows should be double-hung sashes with fanlight above, and the fanlight should be made to fall inwards, hopper-fashion, with side cheeks to prevent down draughts. The area of the windows should be sufficient but not excessive; one square foot of window to every 70 cubic feet of ward space is a suitable proportion. The best aspect for the ward-blocks is usually with the windows facing respectively south-east and north-west. The wards should have adequate means of warming, which may with advantage be so contrived as to furnish a supply of warm fresh air. An ample supply of hot water for baths should be provided, and bath-rooms should be capable of being warmed. The closets and slop-sinks should be placed in annexes separated from the wards by cross-ventilated lobbies. The closets should be water-closets where practicable; and the slop-sinks should be of an appropriate pattern adapted to receive the solid and liquid contents of bed-pans, the waste-pipe being 3 inches in diameter and arranged similarly to the soil-pipe of a water-closet.

The *out-offices* will comprise such buildings as laundry, disinfecting-chamber, mortuary and ambulance-shed; and in large establishments a boiler-house and engine-house may be needed. Except in very small hospitals, the laundry should comprise a wash-house, a drying-closet,



and an ironing-room. An apparatus should be provided for the disinfection by steam of bedding and articles which cannot be washed. The mortuary should be in a cool and unobtrusive position, and should be lighted from the north only.

APP. No. 3.  
Official  
Memorandum

A discharging-block is not unfrequently provided, consisting of an undressing-room, a bath-room, and a dressing-room, in which convalescents may take their final bath and put on clean clothes before leaving the hospital.

Each building which is to contain infected persons or things should be at least 40 feet distant from any of the other buildings.

*The drains of each block should be trapped from the common drain and ventilated separately by an inlet just above the trap and by ventilating shafts at their highest points.*

The annexed block plan A illustrates the arrangement upon a rectangular site of about 2 acres of a hospital containing 16 beds, in two ward blocks with administration-block and out-offices; space being also reserved for future extensions. The best arrangement of the buildings will, however, in practice largely depend upon the shape and contour of the site.

If, owing to the bleakness of the site, it is considered desirable that the several blocks should be connected by covered ways, these should not be enclosed, but should be open at the sides. A screen for protection against wind and driving rain may be provided if desired.

*Hospitals for small-pox.*—In view of the frequently demonstrated liability of small-pox hospitals to disseminate that disease to neighbouring communities, and in order to lessen the risk of such occurrence, the Board require the following conditions to be complied with in the case of small-pox hospitals provided by means of loans sanctioned by them:—

1st. *The site must not have within a quarter of a mile of it either a hospital, whether for infectious diseases or not, or a workhouse, asylum, or any similar establishment, or a population of as many as 200 persons.*

2nd. *The site must not have within half a mile of it a population of as many as 600 persons, whether in one or more institutions, or in dwelling-houses.*

3rd. *Even where the above conditions are fulfilled, a hospital must not be used at one and the same time for the reception of cases of small-pox and of any other class of disease.*

Useful information on the administration of isolation hospitals, derived from experience of them in various parts of England and Wales, will be found in a report [C.—3290] of the Medical Department, 1882—re-issued in 1894.

Local Government Board,  
Medical Department,  
August, 1900.

W. H. POWER,  
Medical Officer.









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